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Contractors and Engineers Monthly

Vol. 39, No. 4 APRIL, 1942 $2 a Year, 20 Cents a Copy

Highlights Of This Issue

- **Wartime Construction**
  As this country settles down to the grim business of waging a war, still greater emphasis is placed on vital construction for war. Nebraska beat the gun by starting needed work on its strategic network last summer, one project being described in this issue. A much-needed gasoline pipe line to the east coast was rushed to completion, while speed in the face of the obstacle of bad weather was the watchword on the construction of a midwest ordnance plant and at the Oklahoma City Airport. The construction of a railroad overhead to serve a new bomber plant is also described in this issue.
  See pages 1, 2, 7 and 17.
- **County Saves Money**
  More money for roads was achieved in Dunn County, Wis., by a considerable savings through a perpetual inventory and requisition system for tools and machines, monthly reports and a well-planned county garage and road program.
  See page 2.
- **Concrete Test Paving**
  Experimental work on the Lombard Highway in Oregon, carried on jointly by the Public Roads Administration and the State Highway Commission, involved a variety of spacings for expansion joints and the use of numerous load-transfer devices, to determine which provide the most satisfactory design for concrete pavement.
  See page 9.
- **Civilian Highways**
  The plans of the New York Metropolitan Defense Transport Committee, establishing and marking a system of civilian routes over secondary roads, in order to clear main routes for the Army in case of an emergency, are described in this issue.
  See page 10.
- **Diesel-Engine Lubrication**
  Another article in our series on the care of equipment to prolong its service life is devoted to the proper lubrication for high-speed diesels. Keep 'em working!
  See page 19.

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A Cleveland ditcher and crew at work on a new 1,261-mile gasoline pipe line in the south.

Long Pipe Line To Eastern Coast

New 1,261-Mile Gasoline Pipe Line to Alleviate Possible Fuel Shortage Recently Completed

By GEORGE H. WATSON

(*Photo on page 52*)

✦ A $20,000,000 gasoline pipe line, designed to help alleviate any shortage of this fuel in the East, was recently completed along a line from Baton Rouge, La., to Greensboro, N.C., a distance of 1,261 miles.

This line was built by the Plantation Pipe Line Co., a joint enterprise of Standard Oil Co. of New Jersey, Standard Oil Co. of Kentucky and Shell Union Oil Corp. Contracts for its erection were awarded as follows: Baton Rouge to the Alabama line, Latex Construction Co., of Houston; Alabama section, Okla-

(*Concluded on page 38*)

Strategic-Network Highway Built with Stabilized Base

(*Photos on page 52*)

Nebraska Rebuilds Section Of U.S. 81, the Winnipeg to Laredo Route; One of Six Projects Started in 1941

✦ U.S. 81 is designated as a part of the strategic network and to the Nebraska Highway Department that meant action. Several projects were started early in the summer of 1941, two between Madison and Columbus in central Nebraska, and four between York and Hebron, near the southern border of the state, well before Congress even considered its Federal-Aid appropriation for highways of this character.

Project SN-5 (7) south from Madison comprised 9.4 miles of stabilized base, prime coat, a bituminous wearing surface and an armor coat, and a 1-mile spur into Humphrey which was not given the wearing surface, but did get the armor coat. The base was built 29 feet wide, 5 inches thick for 6 feet on each shoulder tapering in 3½ feet to 3 inches thick for the center 10 feet, while the bituminous mat is 24 feet wide and 2 inches uniform thickness. This strategic-network contract was awarded to Lee & Johnson Inc., of Sioux City, Iowa, on its bid of $96,635.58 and was completed in 90 working days from June 9, 1941.

The Base Material

U.S. 81 in this section was a dirt road graded in 1940 and with about ½ inch of gravel spread on the surface to hold the roadway during the winter. But when the strategic-network operation began, great care was taken in the selection of the materials going into the base as well as the surface. The base materials consist of a gravel, a sand gravel, a natural or blow sand, and a binder material. The gradations of the various materials were carefully chosen to fit local materials and still provide the proper proportions of each size of material to insure a dense base. The sieve analyses for the various materials were:

GRAVEL	
Retained on 1-inch	0 per cent
Retained on ¾-inch	0- 5 per cent
Retained on No. 4	15- 40 per cent
Retained on No. 10	70-100 per cent
Retained on No. 50	90-100 per cent
Passing No. 200	not more than 5 per cent

SAND GRAVEL	
Retained on ¾-inch	0 per cent
Retained on No. 4	5- 40 per cent
Retained on No. 10	45- 70 per cent
Retained on No. 20	60- 85 per cent
Retained on No. 50	90-100 per cent
Passing No. 200	not more than 5 per cent

FINE SAND	
Retained on ¾-inch	0 per cent
Retained on No. 50	0- 45 per cent
Retained on No. 100	50- 90 per cent
Retained on No. 200	0- 30 per cent

COMBINED BASE AGGREGATES	
Retained on 1-inch	0- 5 per cent
Retained on ¾-inch	0- 10 per cent
Retained on No. 10	30- 60 per cent
Retained on No. 40	60- 80 per cent
Retained on No. 200	70- 88 per cent

The binder consisted of silt, sand and clay, with a minimum of 10 per cent and a maximum of 25 per cent. The per cent of silt and clay was required to be not more than one half the fraction passing the No. 40 sieve. The material passing the No. 40 sieve had to have a Plasticity Index of not more than 10.

Windrowing the Base

The coarse aggregate for the entire job was produced at Columbus, Nebraska. For the south 5 miles of the job it was delivered by truck, using five 8-yard bottom-dump trucks for base material and four 4-yard hydraulic end-dump trucks for stockpiling the armor-coat material. For the north 5.4 miles, the material was shipped in by rail in gondola cars and unloaded by two scrapers into a chute leading to a waiting truck. The hauling from the railroad was done by four 4-yard V-8 center-dump trucks for both gravel and sand-gravel.

The hauling of gravel for the stabilized base for the north end began on July 1, 1941. Stakes were set along the road for the different aggregates, depending upon the amount of that material needed per station. The gravel was first dumped slightly off center on the east side of the road and then all of the other materials were dumped adjacent to it on the right. When the gravel had

(*Continued on page 30*)

HIGHWAY MAINTENANCE IS VITAL TO WAR EFFORT

C. & E. M. Photo

With the necessary curtailment of road construction, maintenance activities take on a new and additional significance. Here are patching operations on the shoulder along a curve on a Minnesota bituminous highway. See page 14.

Sweet Clover Cost $; County's Garage and Requisitions Save $

Dunn County, Wisconsin, has Saved Money Through Better Accounting, But Seeding of Sweet Clover Boosts Mowing

(*Photo on page* 52)

✦ SEVEN years ago there was very little sweet clover along the roadsides of Dunn County, Wisconsin. Then someone interested in increasing the production of honey sowed the seeds of sweet clover on the shoulders of many miles of county highways, resulting in rank growths of this weed up to 5 feet high, covering guard-rail posts and adding hundreds of dollars of expense a year for mowing.

On the credit side of the ledger, however, is a saving of over $1,400 in one year in small tools and parts by the installation of a perpetual inventory of all stocks, a requisition system for purchases, stock transfer bonds for material and parts delivered from the store room to a job, and work orders for parts used in the shop. A monthly report shows all work done, all parts used on each machine each month, the number of hours worked by each machine and on what jobs, and the rental earned that month.

The County and Its Roads

Dunn County, Wisconsin, with its county seat at Menomonie, has an area of 869 square miles, within which there are 424.4 miles of county road of earth, gravel surfacing, oil-mat surface and shale surfacing. There is no concrete paving on county roads. In order to maintain its roads in proper condition both during the open season and in the winter, the County Highway Department employs an average of one hundred men, which increases about 50 per cent during the construction season.

Each voting precinct in the county has a member on the County Board of Supervisors so that there is a total of thirty-five members on the Board. This Board appoints the County Highway Commissioner for one year for his first term, and after that the terms are two years. Ben Braford, the present Commissioner, was Patrol Superintendent for the County for ten years, then left its service for private practice, and has now been County Highway Commissioner for two years. The present Patrol Superintendent is H. Wolf, and D. M. Cotts is Chief Clerk in charge of the Highway Office in the County Court House.

Financing the Year's Program

Dunn County levies a direct real estate tax for the benefit of its highways which in 1940 amounted to $106,000. In addition to this, it received $79,122.20 from the State of Wisconsin as its share of the 4-cent state gas tax. The distribution of money from the state gas tax is figured on a basis of $65.00 per mile of road in the county highway system, giving Dunn County $27,588.60; and then there is a $3,500,000 fund set up from the state gas tax which is divided in the ratio which the total miles of county, town and state roads in the county bears to the total mileage of these roads in the entire state. Sixty per cent of this fund is distributed on the basis given above, and 40 per cent of the fund on the basis of a ratio which the number of motor vehicles registered in the county bears to the total number registered in the state. Any betterment of county roads within the county is paid for 25 per cent by the town in which the betterment is made and 75 per cent by the county. Under this arrangement the townships in Dunn County paid $22,477.09 to the county for betterment on the highways in 1940. On all bridge construction the townships pay 50 per cent and the county 50 per cent. From this source the county received $3,600.00 in 1940.

Additional income for the county results from work done by the County Highway Department in the maintenance of state highways. Payment is received through an hourly rental fee for equipment, with materials being furnished by the state. In 1940 county construction in Dunn County ran to $90,000 and in 1941 about $100,000, with an additional $20,000 oiling program and road-mix work.

C. & E. M. Photo

Andy Omtvedt, Stock Room Clerk at the Dunn County, Wis., highway garage, answers the telephone while a mechanic presents a requisition for parts.

The Equipment Used

The equipment owned by Dunn County, Wisconsin, and used by the Highway Department for construction and maintenance, outside of the garage equipment, is as follows:

1 Barnes compressor
1 Gardner-Denver compressor
1 LaPlant-Choate bulldozer
1 Drott bulldozer
2 Atlas blasting machines
1 batchmeter
2 Gardner-Denver paving breakers
1 Pioneer crushing and screening plant
1 Universal jaw crusher
1 concrete mixer
1 slackline outfit for tractor operation
1 rock drill
1 sinker drill
1 diesel power unit
1 11-yard LeTourneau Carryall with RD8 tractor
6 Austin-Western motor graders
3 Caterpillar motor graders
1 Galion motor grader
1 Warco motor grader
2 Caterpillar pulled graders
1 Allis-Chalmers motor grader
12 Adams motor graders
1 Galion pulled grader
3 Whippet graders
4 Adams horse patrol graders
2 Austin-Western horse patrol graders
27 Caterpillar horse patrol graders
1 Cleaver-Brooks tank-car heater
1 small tar kettle
1 portable light plant
4 pulled mowers
1 Toro power mower
1 road plow
2 hand pumps
1 Gorman-Rupp pump
1 Winslow wheelbarrow scale
1 Ruemelin sand blaster
1 Adams rotary scraper
2 Drott rotary scrapers
1 Baker rotary scraper
1 Perry rotary scraper
1 Euclid fresno scraper
2 Euclid rotary scrapers
3 slip scrapers
6 portable tool shacks
1 P & H 1-yard shovel
1 ¾-yard power shovel
1 ½-yard Byers shovel and trailer
1 Wisconsin special one-way plow
4 motor grader snow plows
9 Wausau V truck plows
1 American V truck plow
1 Bros V truck plow
2 Wisconsin special V plows
1 LaPlant-Choate V truck plow
2 Bros one-way truck plows
4 Wausau tractor plows
2 side wings for motor grader
2 Koch spreaders

(*Continued on page* 12)

C. & E. M. Photo

The Dunn County highway garage at Menomonie, Wisconsin.

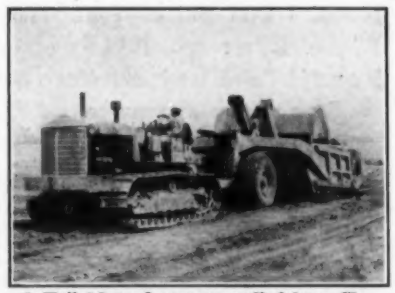
Oklahoma City Airport No. 2

First Wet, Then Too Dry Working Conditions for Grading and Drainage at Municipal Airport

By O. D. HALL

✦ HEAVY rains during 25 days of May and June, 1941, which forced complete or partial suspension of work, did not prevent the El Reno Construction Co., El Reno, Okla., from completing its grading and drainage contract at the Oklahoma City Airport No. 2 well within the 90-days limitation placed on the $90,000 contract. Work started on May 13, 1941, and the project was turned over to the runway-construction contractor on August 9. Dahlgren & Brooks, Oklahoma City contractor, started final grading for the laying of the paving slabs on the two runways on August 11.

Oklahoma City Municipal Airport No. 2 is located near Bethany, Okla., a suburban town about 8 miles from Oklahoma City. When completed, the airport will handle all commercial flying activities for Oklahoma City. Work on Municipal Airport No. 2 proceeded with all possible speed under general supervision of H. E. Bailey, Oklahoma City Manager.



A Heil 16-yard scraper pulled by a Cletrac Model FD tractor which was used for grading at the Oklahoma City Municipal Airport.

Meeting the Problems

Generally favorable soil conditions, absence of labor troubles, and efficient organization and operation were the chief elements which enabled the El Reno Construction Co. to make up for the time lost on account of rain and thus beat the contract limitation bogey.

"We were back on the grading and drainage job right after every rain," reported W. H. Green, El Reno's Superintendent of Construction. "If the ground was too muddy to get on the field with heavy equipment, we used a disk plow to open up low places and then employed utility tractors to pull or push equipment through heavy going. Nearly every kind of soil was encountered from sandy loam to gumbo, but no rock blasting or rock removal was required," Mr. Green added.

Fred R. Hemen, Resident Engineer, reported that during the last six weeks of the work the excessively dry weather presented some difficulties. Mr. Heman said, "In order to maintain our standard of a minimum of 15 to 20 per cent of moisture for scarifying and compacting operations, we had to do an unusual

(*Concluded on page* 45)

Sand-Asphalt Runways and Concrete Aprons Laid by Dahlgren & Brooks During Period of Bad Weather

✦ IN a race against time and enforced delays caused by bad weather, United States engineers and Dahlgren & Brooks, contractor, rushed work on Oklahoma City Municipal Airport No. 2 in order to complete the runways, taxiways and aprons by March, 1942.

Oklahoma City municipal authorities were trying to meet a crying need for private and commercial airport facilities due to the fact that Oklahoma City had leased its Airport No. 1 to the Army.

Following completion of the grading and drainage contract in August, 1941, by the El Reno Construction Co., the Oklahoma City contracting firm of Dahlgren & Brooks started work under its contract to construct runways, taxiways and aprons for the new airport.

(*Continued on page* 36)

Engineers, inspectors and office force on the Oklahoma City Airport No. 2 construction project. Top row, left to right: K. A. Talley, Asst. Clerk; Wm. J. Strah, Chief Clerk; W. T. Upshaw, Asst. Office Engineer; K. K. Coup, Asst. Chief Clerk; John V. Blair, Materials Inspector. Bottom row, J. D. Nettleship, Asst. Clerk; Fred R. Hemen, Resident Engineer; E. C. Trueblood, Jr., Asst. Clerk; Robert W. Hawks, Office Engineer.

A "Must" FOR MILES OF OUR STRATEGIC HIGHWAYS

This narrow, wornout section of a strategic highway will slow down troop and supply movements.

The same highway, widened from 18 to 30 feet and resurfaced with TEXACO Asphalt paving.

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Run Down Those Rumors!

During a period of three weeks in February and March when we were traveling intensively, attending conventions where highways, construction and priorities were the official topics, there was much discussion of increasing the tempo of the war effort. The unofficial topics that were discussed were equally important. In the off-hours we heard the United States Navy sunk several times over, several aircraft carriers destroyed, troop ships wiped out, and by whom? By idle rumor! Not one of the people making these statements could give any further information than that they had heard it from someone else or "they say." Not one of these men was an intentional carrier of fear and foment, but they spoke evil, every word of which could undermine the loyalty and faith of other good American citizens.

How can we stop this insidious peddling of rumors? Here is our remedy and you can use it. Join our "Run Down Those Rumors Brigade." When that good American citizen tells you that he heard that really 33 ships were lost at Pearl Harbor, not the few that the President reported honestly to the nation in his February 23 speech, ask that man who told him. If he is evasive, face him with the charge that he is aiding the enemy that would destroy us. If he gives you the name of the man who told him, either personally speak to that individual or write to him, stating your honest purpose in trying to stop what seems to you to be fabulous rumors. Ask him for the source of his story and request him not to repeat it unless he has unimpeachable evidence of its truth.

Aid American morale by not carelessly undermining it!

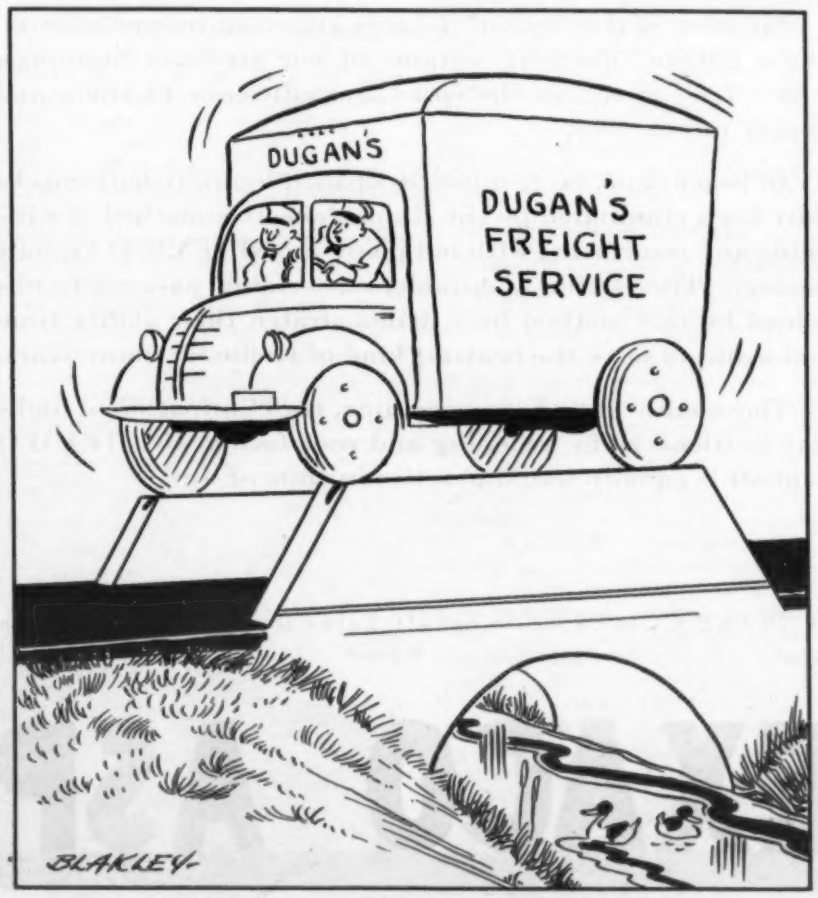
Less Maintenance—The Wolf at the Door

Fewer automobiles, fewer tires, less travel, less gas tax, less money for state and county roads—that, unfortunately, sets up the picture for the duration. Non-military non-access roads are not going to be rebuilt until John Q. Public can again pour gas tax money into the state highway coffers. Some highway engineers are also worried about maintenance funds. Defined by an old timer, "Maintenance is saving what you got," and that activity becomes of increasing importance with little chance of an extensive program of reconstruction for perhaps a half-decade.

Highways built last year will need only the minimum of maintenance this year and next but those a dozen or more years in heavy service are reaching the "it's-cheaper-to-rebuild-than-maintain" stage where less than the most intensive maintenance is tantamount to closing the road to motor traffic. This condition is recognized by most highway engineers who are already planning the most extensive and intensive maintenance programs in their experience, which includes the late unlamented depression.

It is unfortunate that one state has already laid off 125 maintenance men who operated rented maintenance equipment. This would seem short-sighted at a time when this phase of highway activity should be receiving greater attention and thought. This particular state reports that, expecting an immediate reduction in travel and hence less gas tax income, it is beating the gun in economy. Reduced travel does not measurably reduce maintenance needs, as wind and weather carry on their constant attrition of fines on gravel and earth roads and shoulders whether ten or a thousand vehicles use the highway per day.

Maintenance engineers must consider the greatest economies consistent with an adequate maintenance program for the specific type of road surface and shoulder. On gravel roads, the power grader will receive increasing attention to insure maximum economy of operation, its daily patrol mileage will be increased, and greater care taken in blading to conserve gravel. These will be the orders of the day. On the low-cost bituminous roads, light surface treatments must replace the heavier retreads as a maintenance economy, fogging of bituminous shoulders and sand treatment will replace the heavier annual surface treatments. Thus, right up the scale, the more economical maintenance method will be used to spread available funds over the greatest mileage to save base, surface and shoulder, until the day when we have won the peace and more normal highway activity is possible, with well-conceived plans for reconstruction and ever continuing maintenance.



"I'll be damn glad when they widen the bridges in this state!"

Priorities Article Wins Approval of Official of WPB

To the Editor,
CONTRACTORS AND ENGINEERS MONTHLY:

In view of the educational work I have been engaged in for the WPB throughout the country during the last few months, I was particularly impressed by the following statement in the article on priorities which appeared in the February issue of CONTRACTORS AND ENGINEERS MONTHLY:

"Whether an individual business survives or starves will depend upon its understanding of the operation of allocations and priorities."

I thought your article as a whole one of the best I had read but I was unusually impressed by the above quotation. If you could drive home to the average business man the truth contained in this quotation, you would have performed a major part of your duty to your country during these times.

Not enough business men have yet realized that priorities and allocations are as much a part of their business as taxes, labor, etc., and from the questions that come out of our public meetings it is clear that there are still too many business men interested in how they can stay in "Business as Usual."

Keep up your good work!

Cordially yours,
Mason Manghum, Chief,
Business Contact Section,
War Production Board,
Washington, D. C.

"S'matter boss, don't you allow smokin' on the job?"

Truck Spare Parts Have Higher Rating

The War Production Board has announced a 1942 program for the production of spare parts for medium and heavy trucks, designed to keep these vehicles in running order. The Preference Rating available for deliveries of materials for replacement parts has been raised from A-3 to A-2. This program does not affect production of parts for the Army and Navy and other designated government and lend-lease operations. The raising of this rating was necessary to the war program to keep existing trucks and buses running. The A-2 rating will give manufacturers a better opportunity to obtain quick delivery of necessary materials.

Since WPB stopped production of civilian trucks having a gross vehicle weight of less than 16,000 pounds on March 1, it has become necessary to set up a long-range program for spare-part production. Under this program, producers can make, during the entire year, up to 150 per cent of the number of spare parts sold by them for replacement purposes during 1941. In order to give manufacturers more operating freedom, the order provides that from January 1 to June 30, producers may not manufacture more than 75 per cent of the number of spare parts sold by them for that purpose during 1941, and that from January 1 to September 30, the manufacturing limit shall be fixed at 112½ per cent of the number sold during 1941. For the entire year, the rate amounts to 150 per cent.

Many of the replacement parts covered by the orders are interchangeable in passenger cars or light trucks, production of which was halted February 1. In order to permit manufacturers to interchange parts, the orders provide that the A-2 rating may be used to obtain materials for the production of up to 40 per cent of the number of parts that can be interchanged.

1942 American Standards

American Standards for 1942, listing nearly 500 standards in a wide variety of industrial fields and in the fields of industrial and public safety, have been issued by the American Standards Association, 29 W. 39th St., New York City. In view of the importance of standards and specifications, not only for every-day work but to speed up war production, this particular list of standards should be in the hands of the engineering and purchasing departments of every manufacturing firm in the United States, as well as those preparing specifications for materials.

These standards include definitions of technical terms, specifications for metals and other materials, methods of test for the finished product, dimensions, safety provisions for the use of machinery, and methods of work. They reach into every important engineering field, serving as a basis for many municipal, state and Federal regulations.

The list will be sent free of charge to anyone writing to the Association.

How Screen Works Shown By New X-Ray Bulletin

Every prospective purchaser of any piece of construction equipment wants to know how and why it works. Robins Conveying Belt Co., Passaic, N. J., in its new X-Ray Bulletin No. 115 on the Robins-Gyrex vibrating screens, uses a unique method to take the Gyrex screen apart right before your eyes and in the text to get down to earth and tell the whole story about this vibrating screen.

Copies of the bulletin will be furnished to readers of CONTRACTORS AND ENGINEERS MONTHLY by writing direct to Robins and mentioning this item.

Bridge Awards Continue

The American Institute of Steel Construction has announced that it will award plaques to the most beautiful steel bridges built during 1941, this being the fourteenth consecutive year in which the Institute has made awards of this nature. Designs presenting the most aesthetic solutions among monumental bridges, medium-sized bridges, bridges of short span, and movable bridges, will be selected for these awards by a jury of nationally-known architects and engineers.

The jury will make its selections from photographs, and all builders and owners of such structures are requested to submit photographs for this purpose not later than May. 1 with the following data: name of bridge; location; total cost; engineer; fabricator; owner; date completed; date opened to traffic; span length; and roadway width.

New Gar Wood Dealer

The H. H. Crow Equipment Co., 216 East Fourth St., Little Rock, Ark., has been appointed distributor for the Hoist, Body and Tank Divisions of Gar Wood Industries, Inc., Detroit, Mich. This new distributor will also handle Gar Wood winches and cranes.

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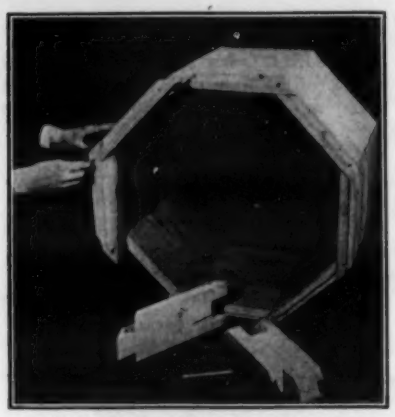


Method of assembling the new Armco emergency all-wood pipe.

No Metals Required In New Wood Culvert

Drainage structures for use in non-defense projects can not be built with critical materials required for war production, nor can such materials be used on defense projects unless the integrity of the construction would be impaired. To relieve this situation, Armco Drainage Products Assn., Middletown, Ohio, has developed a new strong flexible wood culvert requiring no steel bands, nails, nor metal reinforcing of any kind. Unlike the ordinary box-type drainage structure, which is quite rigid, the opening of the Armco Emergency Pipe is made up of a series of short stout wood segments, given an octagonal or other polygonal shape, connected together in an ingenious way to utilize the full strength of the material. The units are shop assembled or fabricated into lengths of 12 feet or more, which in turn are simply joined together in the field to make a single structure.

Increased durability is obtained by treating the wood with a non-critical material. This emergency pipe is intended to outlast the 5 to 10-year period for which most of the present army camps and cantonments are being built. On more permanent installations, replacement can be made readily either by threading corrugated metal through it or by jacking a metal pipe around it and removing the old structure when metal again becomes available for such services. Strength tests show that the emergency pipe possesses many of the structural characteristics of corrugated metal pipe. It has flexibility which enables it to build up side support and increase the load-carrying capacity. The thickness of the wood can be varied with the nominal diameter of the pipe. Favorable comment has been made on this new product by the War Production Board, inasmuch as the pipe segments can be manufactured from short lengths of scrap lumber and no new machinery or equipment is required other than that already possessed by planing mills.

More complete information and the result of tests may be secured direct from Armco by asking for the new 4-page folder which illustrates and describes the features of this pipe.

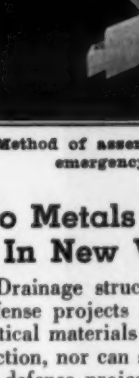
New 1942 Pump Catalog

A new catalog describing and illustrating the 1942 line of Rex Speed Prime centrifugal pumps has recently been issued by the Chain Belt Co., 1666 West Bruce St., Milwaukee, Wis.

These pumps are made in capacities ranging from 3,000 to 125,000 gph, and are featured by positive prime control, Rex Z-Metal impellers, patented air peelers, rotary seals, and replaceable liners. Included in the catalog are valuable data on how to select a pump for a specific job.

Copies of this new catalog, Bulletin 400, may be secured by those interested direct from the manufacturer.

"If winter comes, can spring be far behind?" Road men know that plenty of snow comes before spring does, and that it must be cleared from our highways quickly and efficiently. Here a Mack truck and plow go into action near Watertown, N.Y.



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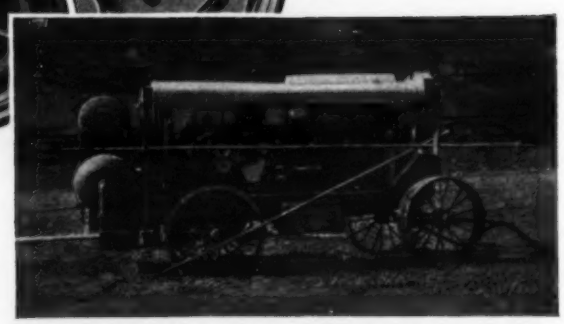
When Compressor Valves Sing...



Ingersoll-Rand Portable Compressor on excavation job. Machines such as this are maintained at high efficiency with minimum of attention when lubricated with Texaco.

. . . it's a certain sign that they are getting too little oil, and are liable to pit and rust. "Upon inspection, valve surfaces should have a greasy appearance," say compressor builders.

Too much oil is equally bad, carbonizing, restricting air passages, preventing proper operation.

For continued top-performance of your compressors, lubricate with *Texaco Alcaid, Algol, or Ursa Oils.*

These oils resist gumming, sludging, carbonizing. Their use assures efficient valves, free rings, open ports and air lines.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distribution points in the 48 States, or write:

The Texas Company, 135 E. 42nd St., N. Y., N. Y.

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★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U.S. is lubricated with Texaco than with any other brand.

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★ More locomotives and cars in the U.S. are lubricated with Texaco than with any other brand.

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FRED ALLEN every Sunday night. See your local newspaper for time and station.

TEXACO

TEXACO Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for War Needs.

Handling Wet Clay At Ordnance Plant

Scrapers, Shovels, Cranes Each Used Effectively to Speed Work; Scraper Costs Studied Carefully

By FLOYD SUTER BIXBY

✦ THE Fruco Construction Co., the Fruin-Colnon Contracting Co., and the Massman Construction Co. recently completed a joint contract for a new midwest ordnance plant under the direction of the U. S. Constructing Quartermaster. The area is readily accessible by water, rail, highway and air to supplies of powder, steel, brass and lead, which indicated the location for this new plant. The contract, awarded a year ago, called for grading the rolling ground on the 850-acre reservation, involving the excavation and haul of nearly 800,000 cubic yards of earth, and the construction of the necessary concrete buildings.

During the course of the job, a check was made of the methods used in rolling up some impressive yardage figures with tractor-drawn scrapers of different makes. The use of scrapers not only solved a difficult problem in the mud but further demonstrated the excellence of these modern machines in excavation peculiarly suited to them.

To dig and move all the heavy clay, it was necessary for the contractors to use tractors and scrapers, bulldozers, trench excavators and a few draglines, shovels and clamshells. At the start of the work a heavy rain drenched the clay soil on the hills. Draglines and trucks were brought in to begin the excavation but there were days and nights when no work could be done. Finally the sun came out and things looked so bright that the government moved up the completion date. Therefore quite a problem of speeding the job confronted Contracting Manager R. C. Stowell, but under his direction operations rounded out in good shape.

Shovel and Dragline Work

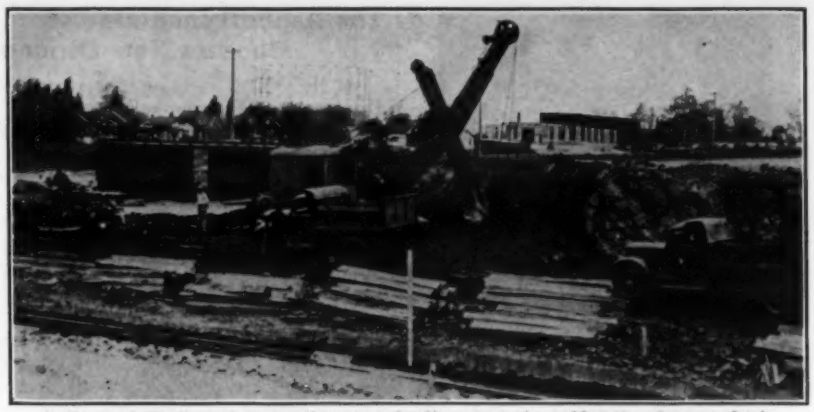
Stowell brought in a 2½-yard Northwest shovel, a 1½-yard Northwest dragline, and a fleet of 15 Ford dump trucks fitted with 5-yard steel bodies and Wood hoists. These machines started digging on the higher knolls where some native fire-clay was present. This hard material was not suited to scraper work, but the dragline dug it easily enough and loaded it out in the Fords. Almost all of this trucked clay, or about 250,000 cubic yards, was hauled to a park site nearby.

The majority of excavation was so balanced that by cutting down the knolls and filling in the valleys the whole reservation would be leveled. All of this work was necessary before much building could be done. Since the time limit on the job was set ahead, it was absolutely necessary that the excavation proceed as rapidly as possible.

Two of the main buildings were 1,000 feet long and two others sat on foundations 800 feet in length. The job of getting these big areas leveled down to grade was the first part of the work to be started. The main building sites were located in general on natural material cut down, with roads and parking areas planned for the fills which would be subject to settlement.

The Scraper Fleet

A whole fleet of tractor-drawn scrapers was brought in. Four International TD-18 TracTracTors, each pulling a new Bucyrus-Erie Model S-90 scraper, were put to work alongside two Caterpillar RD8's with LeTourneau 7-yard scrapers. A short time later three Allis-Chalmers HD-14 tractors towing Model 400 Gar Wood scrapers were put out on the hill. A couple of Cletracs with Heil Dig-'n-Carry scrapers completed the picture.



A 1¼-yard Northwest excavating an unloading zone at a midwest ordnance plant.

The material to be moved was a heavy yellowish red clay, dense and wet from the rains. It dug hard, and had a tendency to bog up in the scrapers in big chunks until the operators became a little better acquainted in handling it. It dug best when a 3 or 4-inch layer was peeled off. These thin layers boiled up fairly well in the scrapers and good loads were taken out each trip. Also, by taking a thin layer, it was possible to load all the scrapers in first gear without the help of a pusher tractor.

The cuts were laid out with as little side slope as possible, for everyone

(*Continued on page 42*)

SAND'S-STEVENS
Line & Surface LEVEL

Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

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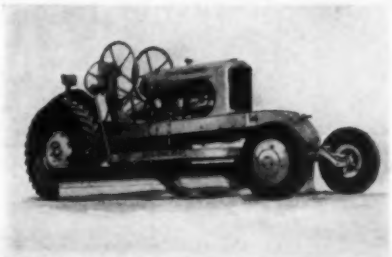
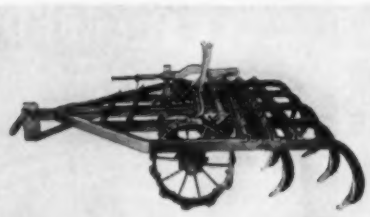
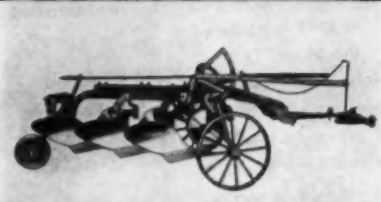
Heavy-Duty Tools That "Stand the Gaff" ON SOIL-CEMENT STABILIZATION



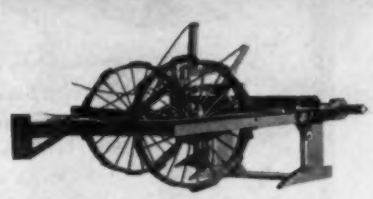
Model W-Speed Patrol for pulling-in edges, shaping and finishing. 10' blade, hand control.



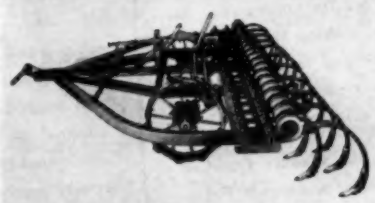
Extra heavy weight chisel for light ripping, mixing and pulverization. Depth control.



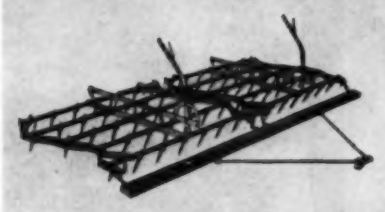
A-C high speed plows provide good mixing action and assure uniform sub-grade.



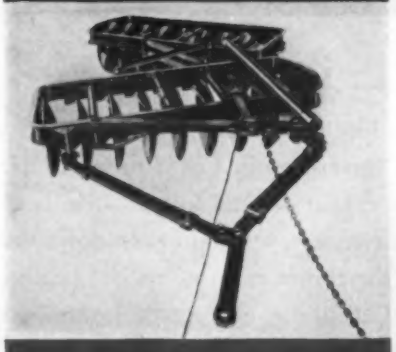
A-C sub-grader scarifies hard surfaced roads and maintains level sub-grade. Depth control.



Big, heavy-duty, soil-cement mixer with flexible coil shank teeth. Depth control.

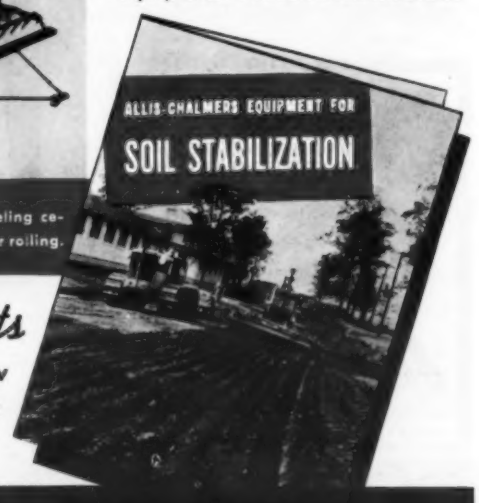


All-steel spike tooth harrow for leveling cement and producing surface mulch for rolling.



Extra heavy, offset disc harrow for pulverization and mixing. Easy turning, depth control.

Here are the kind of tools you need for soil-cement stabilization—long-wearing ... tough ... powerful ... economical! Tools that have had years of service under the most difficult conditions on every type of soil. Tools that have proved they can handle any soil-cement mixture in stride—loam, clay, sand or gravel. A wide selection ... from one source! One supplier ... one service! Rippers, chisels, discs, scarifiers, plows and spike tooth harrows, for pulverizing, rooting and mixing ... in addition to sheep foot tamping rollers, water spreaders, motor graders, wheel and crawler tractors for compacting, watering, grading and drawbar work! For complete information write for booklet: "Allis-Chalmers Equipment For Soil-Stabilization."



Get all the facts
Write for this new booklet ... "Equipment For Soil-Stabilization."

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE, U. S. A.
POWER
IT DOESN'T COST ... *it Pays!*

One of the new P&H-Hansen welders.

New Electric Welders Gas-Engine-Driven

Two new P & H-Hansen gas-engine-driven welder units, known as Model WN-150 and WN-200, with capacities of 15 to 200 amperes and 30 to 260 amperes respectively, have recently been announced by the Harnischfeger Corp., 4419 W. National Ave., Milwaukee, Wis. Equipped with the latest-type P & H-Hansen self-contained welding generators, these new units are powered by a direct-connected heavy-duty 4-cycle 4-cylinder V-type Wisconsin gasoline engine, and are mounted on pneumatic-tired trailers with low centers of gravity which permit towing at normal traffic speeds. The wide welding ranges, single-current positive power controls, and mobility of these units make them particularly adaptable for field or shop use where portability is important.

It is stated that these welders are sturdily and compactly built for lasting service. Hinged side panels allow ready access to the generator and engine. When desired the panels may be swung up and locked in place. Under the canopy, recessed compartments provide ample room for the storage of cables, operators' tools, welding rods, etc. Locks on the panels protect the entire equipment from tampering or theft.

Other features of these new welder units include the all-welded steel channel base construction and telescopic stand. This stand supplies ample support to keep the entire welder unit at a proper level when standing alone.

Further information on these new P & H-Hansen welder units may be secured direct from the manufacturer or from this magazine.

Expansion-Joint Catalog

Servicised Products Corp., 6051 West 65th St., Chicago, Ill., has recently published a new catalog of compiled facts on expansion joints and water seals. This company has manufactured a complete line of expansion joints of various types for over 22 years.

A copy of this catalog may be obtained by writing direct to Servicised.

COMPACT—POWERFUL—SAFE
"For use where power is not practical or available"
Manufactured in 2, 5 and 15-Ton Sizes.
For capacity comparison, ½" cable used:
2-Ton "Lightweight" ..... 75 ft.
5-Ton "General Utility" ..... 250 ft.
15-Ton Triple-Geared "Special" .....1200 ft.
Patent instant gear change and positive internal brake that never fails, and will lock load. Price, f.o.b. Seattle

Gear Ratios	Weight	
2-Ton 4, & 22 to 1	60 lb.	$ 50
5-Ton 4, & 24 to 1	110 lb.	$ 75
15-Ton 4, 19 & 100 to 1	680 lb.	$250

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2724 6th Ave., So., SEATTLE, WASH.
Warehouse stocks for dealers' Supply: Seattle—Chicago—Brooklyn—Houston. Complete Literature and List of Dealers in Principal U. S. Cities and Foreign Countries Gladly Mailed.

The Asphalt Institute Chooses New Officers

At its annual meeting, the Board of Directors of The Asphalt Institute re-elected Herbert Spencer, President, and W. R. Macatee as Managing Director. David Waxman of Shell Oil Co. was named as Chairman of the Executive Committee. Other officers elected included: Vice Presidents, J. A. Blood, Standard Oil Co. of California; C. H. Dresser, Anderson-Prichard Oil Corp.; and H. B. Pullar, Berry Asphalt Co. George R. Christie, Standard Oil Co. of New York, was elected Secretary and Treasurer, with John N. Smith of the same company as Assistant Treasurer.

Byerlyte Corp. of Cleveland, Ohio, was unanimously elected to the Institute, bringing the total number of asphalt producers comprising the membership to thirty.

Recently-released figures of the U.S. Bureau of Mines, compiled by the Institute, show that asphalt consumption for the calendar year 1941 was 22.6 per cent above the previous high attained in 1940, reaching a total of 8,064,000 tons. This record consumption is ascribed to defense activities, particularly upon the airport network, carried on in every section of the United States.

Truck Operators' Handbook

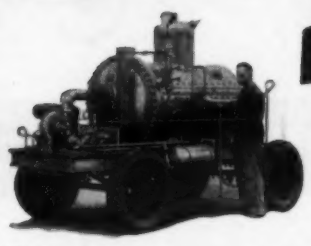
Keyed to the growing realization of the importance of rubber-shod motor trucks to America's war effort is a booklet recently published by The B. F. Goodrich Co., Akron, Ohio, providing new data on obtaining maximum service from truck tires.

Called the "Operator's Handbook," its main feature, because of the vital need of tires to keep the nation's 4,590,000 trucks rolling, is a 15-page section "Factors Governing Truck Tire Service." Included also are charts and tables portraying the value of proper inflation and loads, the dangers in over and under-inflation, mis-matching of dual tires, causes of uneven tread, and the effect of overloads and excessive speeds in generating heat, the prime enemy of rubber.

These and other factors are summarized in 20 practical rules showing truck operators how to obtain maximum service life from their truck tires, in the interest both of rubber conservation and the uninterrupted movement of raw materials and finished goods. Copies of this booklet may be obtained without cost direct from the manufacturer.

STERLING QUALITY
STERLING LIGHT PLANTS
BUILD FOR DEFENSE with STERLING PUMPS HOISTS and LIGHT PLANTS
STERLING MACHINERY CORP.
405-13 Southwest Blvd., Kansas City, Mo.

A DECADE OF PIONEERING AND LEADERSHIP IN THE PORTABLE HEATING FIELD by CLEAVER-BROOKS



1930

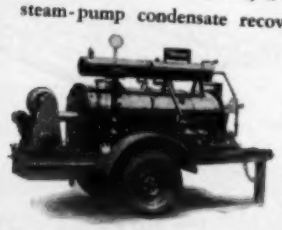
The J. C. Cleaver Co., which became Cleaver-Brooks Co., in 1931 introduced the Model D Tank Car Heater, revolutionizing the wasteful, time-consuming previous method of heating bituminous materials in tank cars. Compact—mobile—efficiently oil-fired—this unit quickly began to replace cumbersome, coal-fired "boilers." Most of these original Cleaver units are still in service.

1932

Heating tank cars by the steam coil method had many limitations. Water supply was often a serious problem; and steam frequently failed to bring application temperatures high enough. The No. 2 Cleaver Booster — fired directly — had many advantages with its removable heating element, designed on the multi-pass, down-draft principle—it soon became recognized as the best direct-fired, bituminous material heater.

1934

Marked many improvements—including a new boiler designed for greater convenience in cleaning water-and-firing surfaces, making tube replacements. At this time, too, a new and highly efficient steam-pump condensate recovery system was adopted.



The model was known as the Cleaver One-Car Heater and was in heavy demand because of its speed and economy of operation, and mobility.

1938

Cleaver tank car heaters were further improved. Streamlined styling was adopted — the water supply problem was practically eliminated by means of a new and novel condensate recovery system, using a turbine type pump. Compact, easily and quickly portable, utilizing the famous Cleaver design boiler with four-pass flue travel, these units are without equal in their field. Hundreds are in service from coast to coast.

TODAY..... in '42

Our "Victory" effort comes first! Greatly enlarged Cleaver-Brooks manufacturing facilities are going "around the clock" for military production.

As America's leading authority on the design and construction of mobile heating equipment, Cleaver-Brooks Co. is proud to devote its skill and experience to the service of the nation's armed forces — on land and sea and in the air. Effective use of the proven Cleaver multi-pass, down-draft heating principle has been made in the construction of special heating — sterilizing — disinfecting — and distilling equipment for military applications, at the front and behind the lines.

Cleaver HEATING EQUIPMENT

CLEAVER-BROOKS COMPANY, 5110 N. 33rd Street, Milwaukee, Wisconsin

Paving 4-Mile Test Section On Lombard Highway, Oregon

Variety of Construction Features Will Provide PRA and State Hwy. Dept. With Data on Joints

By HENRY W. YOUNG

✦ IT is a safe bet that Porter W. Yett, Portland, Ore., contractor, found his 4-mile portland-cement concrete paving section on the Lombard Highway, at the north edge of Portland, anything but monotonous, as paving jobs go. This contract was part of a cooperative research project of the Public Roads Administration and the Oregon State Highway Commission and was divided into many short sections in which the design and construction procedure differed from that in the preceding and following sections. Each section presented new problems and a change in pace for the contractor, and no pavement-laying records were broken on this job.

Part of this highway is 4-lane but most of it is for the present of 2-lane construction, poured in 12-foot strips. The experimental features were concerned with the most effective spacing of expansion joints, and the question of whether "to dowel or not to dowel" for the purpose of load transfer. One section of as much as a mile is without expansion joints of any kind, and some sections have reinforcing while some have not.

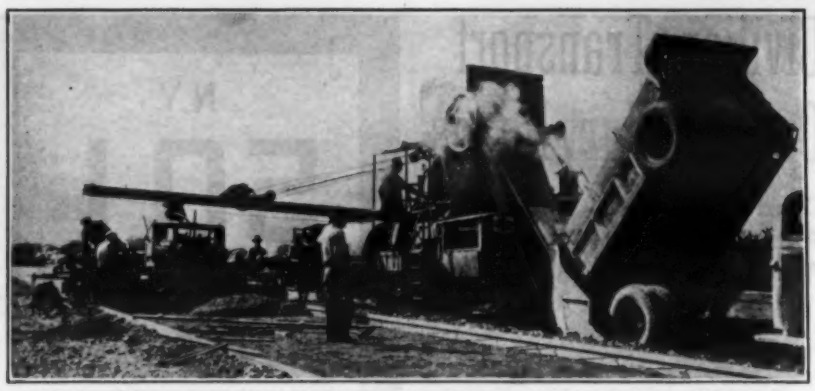
It is planned to carry on tests for two years or more after the completion of the road which, when finished, should go far toward settling some of the hitherto disputed points relative to concrete pavement construction and having a definite bearing on construction costs, pavement life, and the riding qualities of various designs of concrete pavements.

Experimental Features

The investigation of expansion joints called for spacings of 120 feet, 405 feet, 810 feet, and one mile. The sections with 120-foot expansion joint spacings have some of the joints installed with dowels and some without. Reinforcing was placed in some sections and in others omitted. On the Yett contract, which was only 4 miles long, the 810-foot spacings were eliminated.

The following table shows the order of the test sections, the middle one having no expansion joints whatever.

Section No.	Portland-Cement Concrete Pavement	Construction	Spacing c to c
7 (W)	Uniform 8-in.	Exp. Joints without dowels	120 feet
		Contr. joints without dowels	15 feet
6 (W)	Reinforced 9-7-9-in.	Exp. joints with dowels	120 feet
		Contr. joints placed midway between exp. joints. Special dowels and joint filler holders	
5 (W)	Standard 9-7-9-in.	Exp. joints with dowels	120 feet
		Contr. joints with dowels	15 feet
4 (W)	Standard 9-7-9-in.	Exp. joints with dowels	120 feet
		Contr. joints without dowels	15 feet
3 (W)	Standard 9-7-9-in.	Exp. joints with dowels	405 feet
		Contr. joints without dowels	15 feet
1 (1 mile)	Standard 9-7-9-in.	Expansion joints, none	
		Contr. joints without dowels	15 feet
3 (E)	Standard 9-7-9-in.	Exp. joints with dowels	405 feet
		Contr. joints without dowels	15 feet
4 (E)	Standard 9-7-9-in.	Exp. joints with dowels	120 feet
		Contr. joints without dowels	15 feet
5 (E)	Standard 9-7-9-in.	Exp. joints with dowels	120 feet
		Contr. joints with dowels	15 feet
6 (E)	Reinforced 9-7-9-in.	Exp. joints with dowels	120 feet
		Contr. joints placed midway between exp. joints.	
7 (E)	Uniform 8-in.	Exp. joints without dowels	120 feet
		Contr. joints without dowels	15 feet



A Smith 27-E paver and Ord 12-foot finisher at work on the Lombard Highway in Oregon where extensive experiments are being made in expansion-joints spacings and load-transfer devices.

Observations during the two years after the completion of the highway will include a study of subgrade characteristics, joint movement, change of elevation, temperature of concrete and general behavior of the pavement in service. Subgrade tests will include Stabilometer tests on undisturbed samples. Plaster of

(*Continued on page 24*)

This Handbook will help you

PROLONG THE LIFE and MAINTAIN PERFORMANCE of your LORAIN

All the facts in "black and white" covering

OPERATION ADJUSTMENT
CARE LUBRICATION

. . . condensed in one compact, easy-to-read volume.

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COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
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Civilian Transport On Secondary Roads

Disaster Plan Is Tested And Ready for New York Area: Gas Company Maps To Show Civil Routes

By BILLINGS WILSON,

Assistant General Manager, The Port of New York Authority, and Chairman, Metropolitan Defense Transport Committee

✦ IT is generally conceded that the Army would assume control of transportation in any metropolitan area in the event of an actual or imminent invasion. In that case, in the New York Metropolitan Area, the Commanding General, Eastern Theatre, would take over all activities essential to the successful conduct of military operations. This might include placing all transport facilities under martial law, unless the civil authorities could function without Army assistance. For the present, the Army is concerned only with the efficient transport of troops and military supplies, leaving to the civilian authorities the problems of handling civilian traffic without interference with military movements.

The approach to the solution of this problem by the New York Metropolitan Defense Transport Committee has been the selection and signing of a secondary-highway network. The general idea follows the plan of the red and blue networks adopted in England, but goes even further. A subcommittee laid out two secondary routes paralleling every main or military route. After studying and mapping these alternate highways, the Committee's regional plan was submitted to the Defense Councils of New York, New Jersey and Connecticut and to the Police Department of the City of New York. The highway departments of all three states have adopted it.

The subcommittee then designed a uniform secondary-highway sign for use by the three states and New York City in marking these secondary civilian routes. These signs were necessary because many of the secondary routes traverse highways and city streets now little used by the average "through" motorist. In many cases they are unmarked and in others, through secondary routes consist of several stretches of highways each with a different number. The new Civil Route numbers are all in the 500 series, ranging from 501 to 594, there being 28 such routes. Wherever possible the new numbers are related to the existing highway marking scheme. For example, Civil Route 501 parallels U.S. 1 and Civil Route 532 is an extension of New York Route 32 into New Jersey.

The standard sign is black on white, measuring 16 inches square, and carries the state initials, the route number and the word "Civil." Careful consideration was given to the wording of this sign so that it would have Army approval. The Army does not want any routes publicly marked with the words "Military" or "Army," for obvious reasons. Erection of these special signs has been completed by the three states and is under way in New York City. These new Civil Route numbers are being shown on all 1942 oil company road maps for the Metropolitan Area, which is very important to the motoring public.

New road signs marking Civil Routes over secondary highways to take care of civilian traffic in the New York Metropolitan Area in case of an emergency. For efficiency, a secondary route extending through more than one state bears the same Civil Route number.

Use of Marked Routes

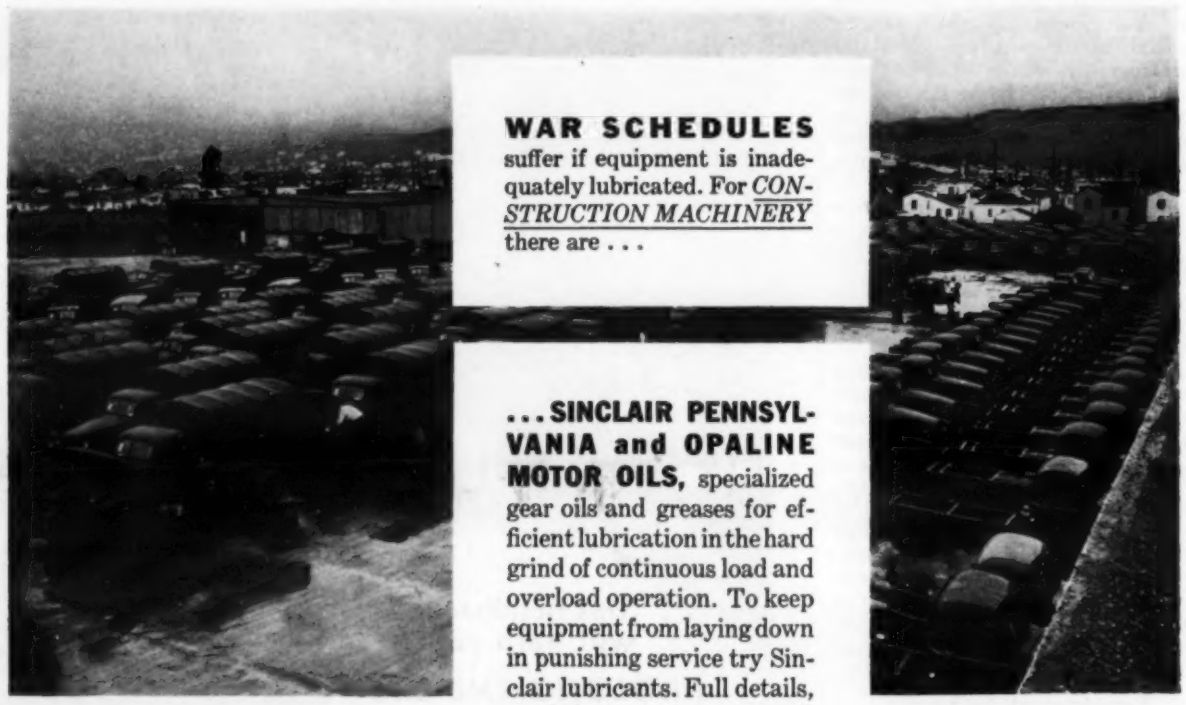
The value of this civilian highway system in New Jersey, for example, is readily illustrated. Suppose the Army had commandeered New Jersey Routes 25 and 27, two main highways, for a half day or more, even though Route 27 is one of the civilian secondary routes. What would happen to the normal civilian traffic moving, for example, between Philadelphia and New York? Assuming that most of it could not obtain a priority to use the military route, the ordinary civil and commercial traffic between these cities could be directed to Civil Route 522, which in general paralles U.S. 22. This Route 522 goes through Lambertville, Flemington, Bedminster, Summit and Newark direct to Tonnele Circle in Jersey City without once crossing Routes 25 or 27 at grade.

Bottlenecks

Taking a realistic view of a possible large-scale emergency, one realizes that it is not enough merely to designate alternate routes for civilian use. The objective is to keep traffic moving, and the Metropolitan Committee is fully aware that narrow pavements, bridges with low vertical clearance or limited capacity,

(Concluded on page 50)

RITECURE
THE "ORIGINAL"
Colorless CONCRETE CURING COMPOUND
Approved for DEFENSE PROJECTS
Effective—Simplified—Economical
CURING MATERIALS COMPANY
2130 JANE ST.
EVERGLADE 2200 Pittsburgh, Pa.



WAR SCHEDULES suffer if equipment is inadequately lubricated. For *CONSTRUCTION MACHINERY* there are . . .

. . . SINCLAIR PENNSYLVANIA and OPALINE MOTOR OILS, specialized gear oils and greases for efficient lubrication in the hard grind of continuous load and overload operation. To keep equipment from laying down in punishing service try Sinclair lubricants. Full details, or lubrication counsel, promptly furnished upon request to nearest Sinclair Office, or Sinclair Refining Company, 630 Fifth Avenue, New York, N. Y.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

MARION *power shovel loading trucks at mine of Sunlight Coal Corporation, Boonville, Ind. Sinclair lubricants used.*

SINCLAIR LUBRICANTS-FUELS

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • Rialto Bldg., Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth

The new Eisemann tester for magneto windings.

Testing Magnetos Quickly and Surely

In these days when every piece of electrical and other equipment must be made to operate at top efficiency and maintain a longer life, the announcement of the availability of a tester for magneto windings which eliminates all uncertainty as to whether or not a given winding meets specifications in every respect, or is imperfect and should be replaced, is important.

The Eisemann Magneto Corp., 60 E. 42nd St., New York City, has brought out a tester complete with an instruction sheet and booklet giving full operating directions and exact specifications covering the windings and complete armatures for more than 300 magneto models manufactured by seventeen companies. The specifications give the maximum current required by a good, usable winding of each type and make in order to fire regularly the 5 m/m open-air three-point gaps of the tester. Thus the serviceability of the winding under test is determined by checking against these specifications.

The 800 authorized Eisemann service stations in the United States, Canada and some foreign countries have each been equipped with one of these testers. Complete information regarding the purchase of testers and their adaptability to shop service may be secured direct from the manufacturer by referring to this item.

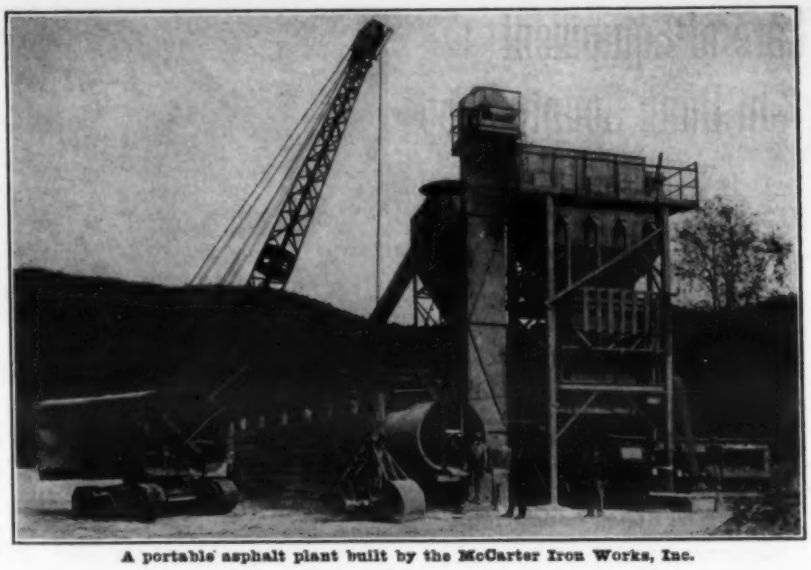
New Portable Plants For Hot or Cold Mix

To insure the maximum production in any one season a portable asphalt plant must be easy to set up and take down and readily moved from one job to another with the minimum of lost time. The McCarter Iron Works, Inc., Norristown, Pa., boasts that with a McCarter plant you can finish one job and be ready to operate at a different location in two weeks. These plants are furnished for either crane erection or by winches.

One of the most recent plants furnished by McCarter was for American Asphalt Products Co. of Washington, D. C. This plant was used on the Skyline Drive in Virginia and turned out as much as 800 tons per day which cut considerable time off the contract schedule.

The plant is powered with two diesel engines, one for the drier and one for the mixer, with an additional gasoline engine generator which furnishes power for the smaller electric motors driving the elevators, feeders, vibrating screen, and asphalt pump unit, as well as a small air compressor to atomize the oil at the burners when starting up before sufficient steam pressure is available. The plant is equipped with a four-compartment bin, and with a vibrating screen of two split decks for four separations and rejects. The plant has a 2-ton mixer, dial scales and a timing device for the mixing cycle. The drier is arranged to produce either hot or cold aggregates. A dust collecting system is provided as well as the usual accessory tanks, superheater and steam-jacketed piping. The contractor furnished his own steam boiler for the job. This same plant could also have been equipped for all electric heat to eliminate the boiler installation.

Full details on various types of McCarter steamless asphalt mixing plants made in three sizes for hot or cold mix and for either permanent installation or for portable service may be secured from McCarter by mentioning this item.



A portable asphalt plant built by the McCarter Iron Works, Inc.

HEET-MASTER—SAVES 50% ON FUEL

HEATS TAR & ASPHALT TWICE AS FAST

Send for Bulletin No. 196 HEET-MASTER Kettles for FREE on Contractors

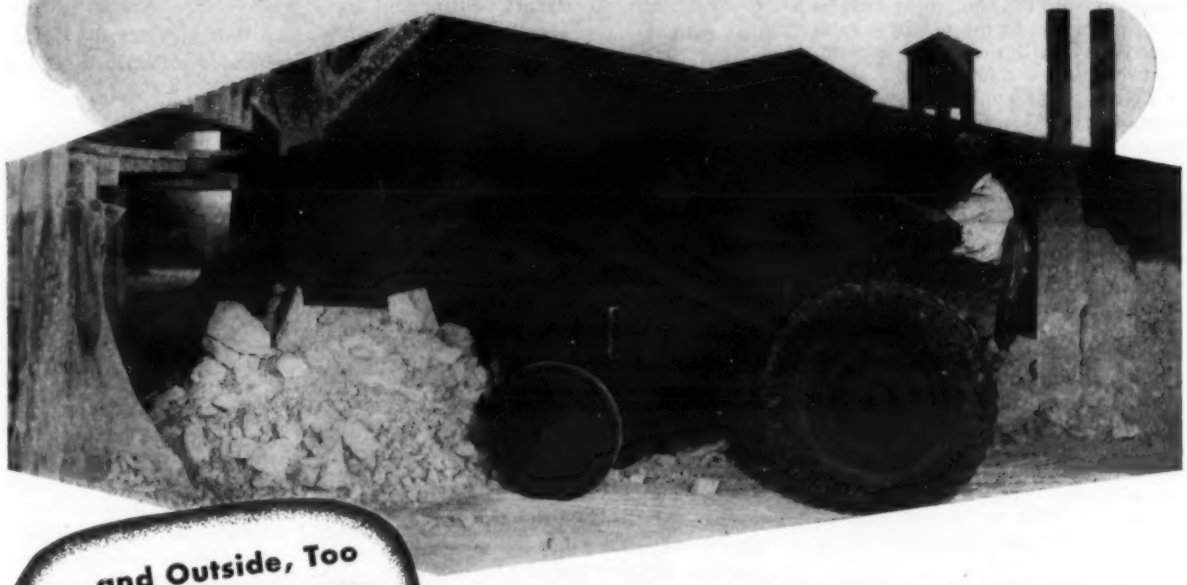
AEROIL BURNER CO., INC.

3778 Park Avenue, West New York, N. J.

Chicago San Francisco Dallas

. . For the New Speed-Up

Inside the Plant



. . and Outside, Too

JOB-PROVED POWER

Sees Things Through

★

Cranes Go Anywhere when supported and powered by a Case tractor in either of the larger sizes. Shown here is the new "LAI" and Mercer Model 7 crane with double-drum hoisting unit, an outfit of great stability for heavy lifts. Various makes and models offer also single-drum designs, full-circle swinging cranes, electric lifting magnets and other specialized equipment. Extra chassis strength of Case tractors fits them for crane work.

War is no time for faltering, either by men or machines. If you are producing something important . . . and especially if materials must move with production line promptness . . . there is a priceless value for you in the dependability for which Case industrial tractors are known.

This dependability is largely the result of durability in every piece and part, big and little—durability doubly valuable for its own sake, too, in times like these. Such dependability and durability are not created in a hurry. They come from experience that began with building of the world's first gas tractor in 1892, steam power onward from 1869, and other outdoor machinery from the founding of the business a hundred years ago.

Four sizes of Case industrial tractors cover a weight range from 2400 to more than 11,000 pounds, furnish fast, flexible power for jobs as varied as industry itself. Your Case distributor can furnish all manner of special equipment, both mounted . . . such as the White loader shown above on the "DI" . . . and for drawbar work. J. I. Case Co., Racine, Wis.

Swift, Clean Sweeping. Several types and sizes of rotary brushes are built for use with Case tractors. Some are specially designed for fast mounting and removal. All will permit the tractor to be used for drawbar jobs with brush in place. The tractor model shown here is Model "VI."

Roadway Maintenance. Mobility plus unlimited crowding range makes a Case-powered loader quickly available for scattered jobs and scattered materials. Several makes, types and sizes of loaders match varying conditions and tractor models. There are also mowers, sweepers, maintainers

CASE

Care of Equipment In Dunn County Shop

(*Continued from page 2*)

1 multi-purpose machine
1 stump puller
1 Caterpillar Sixty tractor
1 Allis-Chalmers Model K tractor
1 Caterpillar Seventy tractor
3 Allis-Chalmers Model L tractors
1 Caterpillar RD6 tractor
2 FWD trucks
8 Oshkosh trucks
2 Walter trucks
11 International trucks
1 Chevrolet pick-up truck
3 GMC trucks
9 Chevrolet trucks
1 International pick-up truck
1 Ford truck
1 40-ton La Crosse trailer
1 bituminous distributor
3 wing wideners
1 pile driver
243,800 feet snow fence
24,699 snow fence posts

Equipment Repair and Storage

The county maintains one central repair garage at Menomonie and district garages at Colfax, Wheeler, Boyceville and Ridgeland. It also hires garages for the storage of snow plows at Sand Creek and Rock Falls.

The main garage located at Menomonie is of brick construction 100 x 50 feet in two sections, with the front used for storage and the oil room, and with a large door between the two sections to permit large equipment to be moved into the repair shop with facility.

The repair shop is well equipped for overhauling engines and equipment so as to eliminate breakdowns and, if they do occur, to put the equipment back in service promptly. In the repair shop is a heavy-duty drill press, power hammer, two lathes, a power drill, a small and a large power grinder, and a power hacksaw. In the blacksmith's shop adjacent is an acetylene welder and cutter, a magneto and spark-plug tester, a Manley hydraulic press, a brake riveting machine and another large power grinder, and two P & H-Hansen arc welders. A well-built welding cabinet with a curtain at one side to protect mechanics working nearby from hot metal, and with a hood and fan to draw out the fumes, makes a very convenient working unit. Within the cabinet are welded shelves for the storage of the various types of welding rods used. Included also in the garage equipment is one garage compressor, an oil purifier and filter, a battery charger and a gooseneck portable crane for moving engines and other heavy parts about the repair shop.

The stock room is partitioned off at one side of the shop and everything is delivered on stock transfer forms and work orders. Metal bins are used for all of the small equipment, back of the stock room is a store room for larger parts, and below this a basement built in the winter of 1940-41 for tire storage, small hand tools, grader blades, paint and bomb torches.

The old wooden garage out near the main highway is now used for unheated storage, for the sign shop and for miscellaneous storage.

Snow Plowing

Dunn County, in the western part of Wisconsin and pretty well north, is in the heavy snow belt, with from 18 to 24 inches of snow on the ground at all times during the winter. The snow was packed so hard during the latter part of the winter of 1940-41 that it was impossible to push it back with the regular equipment, and dynamite was used to loosen the packed snow.

C. & E. M. Photo
A P & H 1-yard shovel, one of three excavators owned by Dunn County, Wis., loading shale into a GMC truck for a new intermediate road surface.

The method of handling snow removal is to put all of the equipment out on the 155 miles of state road as soon as the storm starts, for which the county is paid on an hourly rental basis. After the storm has subsided and the state roads are clear, then the equipment is moved on to the county roads. Generally the county roads are all open within 10 hours after plowing starts and the 1,000 miles of town roads, the plowing of which follows after the county system, are all plowed within 24 hours after a storm of average intensity has ceased. Some of the townships do their own plowing, but the 1,000 miles mentioned represents the mileage taken care of by the county.

One-way plows are used for widening the traffic way, and on state roads to keep them open when drifting continues after the storm has subsided. The V plows do all of the initial work. Particular attention is made to plowing routes used by school buses to permit them to get through promptly.

Shaling and Oiling

An intermediate surfacing for Dunn County roads rating between the earth or gravel road and the black top is the shale surface. The shale is a poor grade of friable rock which is quarried along the roadside, placed on the road, handsledged and then rolled until it packs tightly on the road surface. It does not pit readily, is reasonably waterproof, but is dusty in dry weather.

The shale is quarried usually on a 24-foot face with the holes drilled about

(*Concluded on next page*)

FRANK, WARTIME MESSAGE TO CONTRACTORS AND ENGINEERS

Why It's Difficult to Get LeTourneau Equipment Now

***Defend America*—that was the 1941 national program. To keep pace, LeTourneau doubled production, delivered 85% to high-rated projects. Practically all of this and some more—95% of our output—was sold through regular LeTourneau-"Caterpillar" dealers for delivery to private contractors working on cantonments, ammunition dumps, airports, etc. That was 1941.**

Fleet of C Tournapulls working on an offshore airbase.

Deliveries to Speed Offensive

Today, we are at War, striving desperately to take the Offensive. Our Government has asked us to increase production. LeTourneau expects to build 50% more equipment in 1942 than ever before. Most of it will go directly into active combat service with the U. S. armed forces. The remainder will work night and day to construct offshore bases, airports, plane assembly plants, war factories and training camps urgently needed for Offense and Victory.

A few of you who are working on these vital Victory projects, will be able to get new equipment. To many, though, the Victory program means using for the duration the equipment you now have.

If, like hundreds of other successful contractors and engineers, you already have LeTourneau Carryalls, Dozers, Rooters and Tournapulls, you're fortunate. That equipment was built stoutly for long life. Thanks to LeTourneau welded alloy steel construction, it's easy to repair; can be economically reconditioned to practically new working efficiency.

Expert Service Available

Your LeTourneau-"Caterpillar" dealer carries a large stock of factory-made parts to serve you with a minimum of delay. He has expert, factory-trained servicemen ready to help you with your equipment maintenance and overhaul problems. Many LeTourneau dealers are equipped with portable welding outfits, to give you time and money-saving service right on the job. All have excellent shop facilities.

So to keep your equipment operating steadily, see your LeTourneau-"Caterpillar" dealer.

BREAKING IN NEW OPERATORS?

Give them *The Co-Operator*—written by and for tractor operators, in the interests of making tractor power go farther through the proper care and use of LeTourneau earthmoving equipment. It's read regularly by over 20,000 operators, engineers, superintendents, foremen and mechanics who want to learn more about:

Equipment repair and maintenance . Cable care, selection and operation . Care of tires . Lubrication . Job layouts, methods of cut, fill, compaction, etc.

***The Co-Operator* is offered to you and your men absolutely free—10 fact-packed issues yearly. You can get as many copies as you need by writing *The Co-Operator*, R. G. LeTourneau, Inc., Peoria, Illinois. Send . . . NOW!**

TOURNAPULLS HAUL OVER CITY STREETS ON CONN. ROAD JOB

***PROBLEM:* On a Connecticut road job Contractor John Arborio had to borrow material from pit on one side of town, haul through the business district and fill on the other side of town.**

***SOLUTION:* Use of three Super C Tournapulls on the long haul earthmoving. Their big rubber tires permitted them to travel over city streets (below) without surface damage. Fast acceleration and travelling speeds up to 14 m.p.h.—plus powerful, sure-acting brakes—enabled the Tournapulls to move safely with automobile traffic and average a round trip of 1.9 miles every 16 minutes.**

C.H.&E.
Saw Rigs
Pumps
Rollers
C. H. & E. MANUFACTURING CO.
3810 No. Palmer St., Milwaukee, Wis.

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA
Cable Address: "BOBLETORNO"
CARRYALL* SCRAPERS, ANGLEDOZERS*, BULLDOZERS, ROOTERS*, POWER CONTROL UNITS, TRACTOR CRANES, PUSHDOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*, TOURNACRANE.
*NAME REG. U. S. PAT. OFF.

Low-Cost Road Work On County Highways

(*Continued from preceding page*)

12 feet back from the face and then toe holes at the bottom to lift the burden. The county uses its Gardner-Denver compressor and one jackhammer for drilling the holes and then loads them with 40 per cent Atlas dynamite and Atlas caps, using a hand blasting machine for firing. The rock, which breaks up readily, the maximum size being the ordinary nigger head, is loaded into trucks by a P & H shovel. Hauls as great as 6 miles are not uncommon with the fleet of county trucks. The material varies from ½ inch to 3 inches in size after the shale is sledged by hand on the road, and is spread by an RD6 tractor with a LaPlant-Choate bulldozer. The larger pieces are bladed to the center of the road after hand sledging, and windrowed so that they may be more readily broken up with a minimum number of passes of the 10-ton gas roller. When pot holes show up on a road which has been shaled, they are repaired by running several motor graders over the surface to cut it smooth and fill in the breaks immediately following wet weather.

The highest type of road surface used in Dunn County is the oil mat, which is a road-mix operation. The subgrade is first built up and all drainage checked to eliminate frost boil conditions. Then 520 cubic yards of crushed gravel or the maximum ¾-inch stone, amounting to about 50 per cent of the load by volume, is spread per mile of 26-foot road in a 12-foot windrow. This is shot with 0.2 gallon of SC-6 or 7 road oil per square yard, using the county's own Rosco 1,000-gallon distributor. A battery of five power graders is then started up and down the road being surfaced, working the material back and forth across the road with successive shots of 0.2 gallon per square yard being added by the distributor until the material is well covered. It is then spread and compacted by traffic. It is routine to mix 4 miles of this material per day and lay 2 of them to give a 1½ to 2-inch mat. During the summer of 1941 over 50 miles of road mix were laid on county highways, in addition to the frost-boil patching on state roads for the State Highway Department.

The County Crushing Plant

The county owns a Pioneer No. 16-V Duplex crushing plant which moves from one gravel pit to another to produce the aggregate needed for its road-oiling program. Material is stockpiled in weather during which aggregate can not be used but when the plant can be operated satisfactorily. In order to facilitate moving the plant a duplex drive was added at the rear, giving greater traction and reduced weight on the axles.

As an outside activity, the county crushes about 10,000 tons of agricultural limestone each winter and sells it to farmers for use on their crops. The 15 x 24 jaw crusher of the Pioneer machine and the 20 x 24 roll crusher make this plant particularly adaptable for this wide variety of work in crushing ¾-inch material for road work and the much finer agricultural limestone for the farmers.

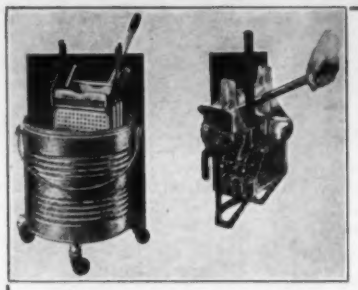
New Euclid Distributor

The Euclid Road Machinery Co., Cleveland, Ohio, announced recently the appointment of the Tri-State Culvert & Machinery Co. of Atlanta as its distributor for the state of Georgia. L. J. Moore, President of Tri-State, has had wide experience in the construction equipment field and has established an outstanding organization for the sales and service of Euclid equipment and the other nationally known lines handled by this company.

Bituminous Road Manual

A manual prepared to cover all of the ordinary uses of Tarvia and Tarvia-lithic paving materials for both construction and maintenance has been prepared by the Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York City, for the use of local road officials in counties and townships. The first portion of the manual describes the operations and pavement types in which these materials are used, while the second portion describes the manner in which the various Tarvia methods may be utilized in the repair and maintenance of different pavement types.

Copies of this bulletin, No. 745, with 64 pages of illustrations, text and tables will be furnished free to readers of CONTRACTORS AND ENGINEERS MONTHLY writing direct to Barrett.



Complete line of Mop Wringers, Mop Buckets (Rubber castered), Mop Trucks (Twin type), Tangleproof Mop Sticks.

Amazing Service Records

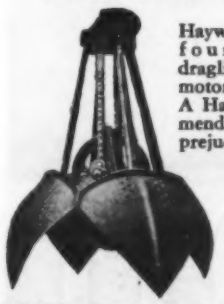
Doubles Mop Life—Saves Work—Saves on Cleaning Compounds—No Splashing—Saves Floors

Illustrated here is just one of the striking GEERPRES features: Overlapping staggered gears which completely eliminate side-slip and insure smooth operation.

Geerpres Units are 30% lighter, with stronger arc-welded construction. Permanently rust resistant. EXCEPTIONALLY LONG LIFE.

GEERPRES WRINGER, Inc., P. O. BOX 152 MUSKEGON, MICH.

USE RIGHT BUCKET FOR THE JOB



Hayward makes all four—clamshell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.

HAYCO

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

AMERICAN CABLE TRU•LAY *Preformed* IS HELPING

This is no time to have machine shutdowns. By lasting so much longer TRU-LAY PREFORMED reduces shutdown frequency and steadies production.

This is no time to have workmen laid up with blood-poisoned hands. Some operators have drastically reduced accidents by adopting American Cable TRU-LAY PREFORMED—the *safer* rope.

This is no time to waste steel through the use of short-lived equipment. By lasting longer and working better TRU-LAY PREFORMED conserves steel for other essential machines.

American Cable engineers will gladly give you the benefit of their experience in helping you make your wire ropes last longer. All American Cable ropes made of Improved Plow Steel are identified by the Emerald Strand.

AMERICAN CABLE DIVISION • WILKES-BARRE • PENNSYLVANIA

District Offices: Atlanta, Chicago, Detroit, Denver, Los Angeles, New York, Philadelphia, Pittsburgh, Houston, San Francisco

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

Maintenance Patches Keep Highways Safe

Minnesota Patrol Section Repairs Holes as Soon as Breaks Occur in Pavement to Save the Surface and Protect Traffic Using the Road

(*Photos on pages* 1 *and* 52)

✦ DRIVING west on Minnesota Highway 95 from Princeton, Minn., this past summer, we met a two-man maintenance crew busy patching the bituminous surface. We had driven over numerous patches between the town and the time we met the patrol and, noting their uniformity and smoothness, we stopped to get the "how". In the absence of the regular patrolman, Section Helper John Thompson was in charge, with A. H. Johnson as assistant, and they demonstrated for notebook and camera the methods used.

This particular work was being done preparatory to "fogging" the curves and shoulders where there was not enough oil in the original mix. The repair material used for patching is prepared by blade mixing in a windrow at a suitable location with about 18 gallons of tar per cubic yard of sand and gravel. This district has found that better mixing of patching material is secured in this manner than by mixing in a small drum mixer. As soon as the material has been thoroughly mixed, it is hand-loaded into trucks and stockpiles.

Making the Patch

Sufficient patching material for at least half a day is loaded into the dump body of the Ford V8 truck which tows a tar kettle behind.

Patches are made wherever there is any break in the surface because the smaller the break the less patching material is required, and the less damage there will be to the road because once a break in the surface is started it ravels quickly.

All of the loose material is swept out of the hole, but if it is deep it is cut down vertically to a depth of about 2 inches so as to give a firm square shoulder facing traffic to prevent the material from shoving as heavy trucks pass over it. Hot tar is drawn from the heating kettle and sprinkled over the hole to insure a good bond between the base and the patching material. Then the tar patching mix is shoveled into the hole in a sufficient quantity to fill it slightly above the surface, and it is then carefully raked to insure a uniform texture so that it will compact evenly. The final operation is running the truck over the patch two or three times so that the tires may compact it and iron out any possible bump which would be noticed by motor traffic.

The operations on Highway 95 west of St. Cloud were under the direction of R. D. Jorgens, District Maintenance Engineer, District 7, Minnesota Highway Department, St. Cloud, Minn.

C. & E. M. Photo

Raking tar patching mix into a hole on the edge of Highway 95 west of Princeton in Minnesota.

Thor Expands Services

With the recent removal of its Detroit branch to its own new building at 15,605 Woodrow Wilson Ave., the Independent Pneumatic Tool Co. of Chicago, Ill., manufacturer of Thor portable and pneumatic electric tools, is continuing the expansion of its nationwide service facilities. The opening of the new Detroit building marks the completion of the fourth new service station within the past 15 months. Other such buildings have been opened in Philadelphia, San Francisco, and St. Louis, each completely equipped with men and machines to render prompt and efficient repair and reconditioning service to the users of Thor tools.

In addition to this expansion of local service facilities, Thor has recently expanded its factory production facilities with new additions in space and equipment at both its Los Angeles, Calif., and Aurora, Ill., plants. These works are both operating at peak capacity to speed production for the nation's war effort.

New Power Control Unit

A new two-drum power control unit, known as the R6-7-8 unit, and designed for interchangeability, has been announced by R. G. LeTourneau, Inc., Peoria, Ill. It has a line pull of 5,000 pounds, making it possible to handle large loads easily, and the face plate is drilled to allow easy mounting on D6, D7 or D8 Caterpillar tractors.

Complete information on this new power control unit may be secured by writing direct to R. G. LeTourneau, Inc.

MICHIGAN Mobile CRANES are the right "set-up" for today's vital construction projects because

MICHIGAN's stable low-slung frame provides wider working ranges.

Weight evenly distributed on ten large pneumatic tires permits low unit ground pressures.

Operators work faster—with greater precision and less fatigue through MICHIGAN's Air Controls.

Ample power for heavy lifts supplied by heavy duty motors.

Only a couple of hours required for converting to any standard attachment—Shovel, Clam, Dragline, Trench Hoe.

Valuable time saved *all-the-time* by MICHIGAN's "truck-mobility."

Find out why MICHIGAN Mobile CRANES will help you to meet today's "rush-construction" schedules—write for Bulletin C-42.

MICHIGAN POWER SHOVEL CO.
BENTON HARBOR, MICHIGAN

MICHIGAN
AIR-CONTROLLED
SHOVELS - CRANES - CLAMS - DRAGLINES - TRENCH HOES

TARPAULINS
ROAD MATS
WINDBREAKS ★

CONTRACTORS' SUPPLY DEALERS in every state sell the Fulton line. Specify SHURE-DRY and FULTEX Tents, Tarpaulins, and Windbreaks—anything made of canvas. Also Fulco Road Mats and Burlap. Fulton products are good and prices are right. *If your dealer can't supply you write our nearest plant for catalog, samples and price list.*

write for prices

Fulton Bag & Cotton Mills

Preference Ratings Limited to Repairs

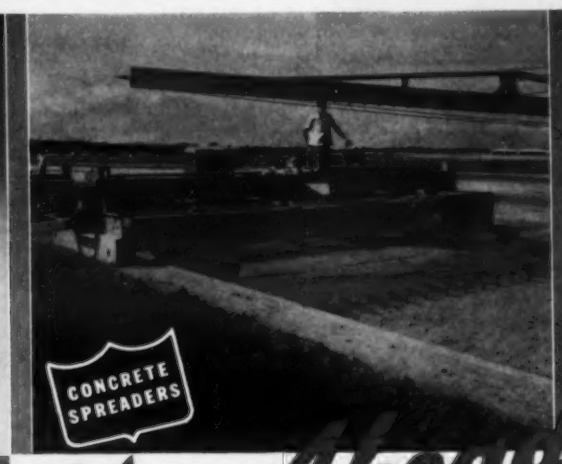
On March 11, 1942, the War Production Board announced amendments to Preference Rating Order P-19-e, administered by the Public Roads Administration and used to extend priority assistance to highway contractors. The changes in the terms of the order eliminate any extension of the preference ratings granted to a road or a highway project to the purchase of road-building machinery and equipment, although the preference rating may be used to expedite the delivery of repair parts when necessary to prevent stoppage of work which might result from accidents to equipment or failure through extended wear. When new equipment is necessary for an essential project, application for a preference rating may be made on Form PD-1A.

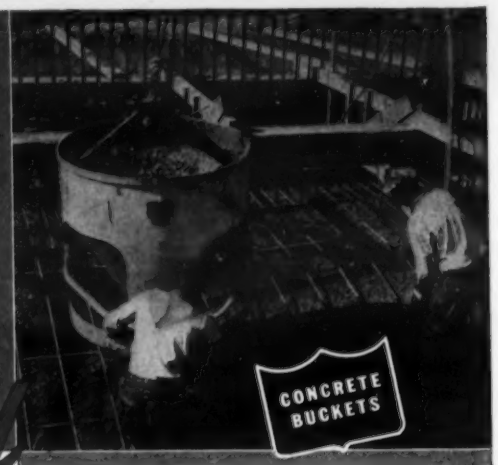
Williamson Now Manager

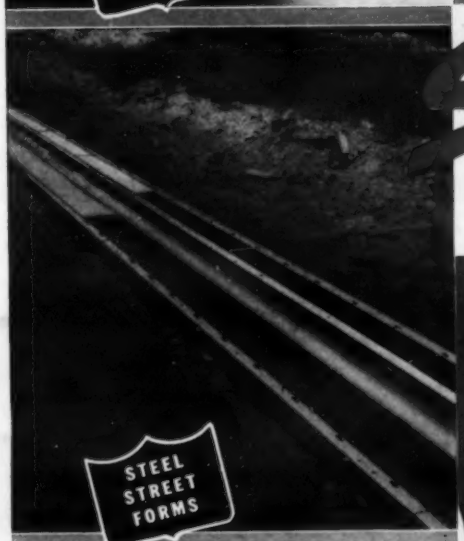
A. O. Williamson, who for the past seven years has been Chief Engineer of the Road Machinery Division, Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn., has been appointed Manager of the Division, succeeding John R. Ritchie. Mr. Williamson was educated at the Dunwoody Institute and the University of Minnesota, spent nine years in design and production of plows for the Rotary Snow Plow Co. of Minneapolis, and one year as Chief Engineer, Road Machinery Division, American Hoist & Derrick Co., St. Paul, Minn. He brings to his work as Manager of the Road Machinery Division of Bros a wide background of design and engineering of hydraulic and mechanical trail-builders and bulldozers, tank-car heating equipment, road rollers and other similar equipment.

DeVilbiss Branch Moves

The DeVilbiss Co. has moved its St. Louis, Missouri, Sales and Service Branch to 2737 Washington Avenue, where improved parking facilities will make it more convenient for the trade to take advantage of the services offered by this branch.







Step Ahead
Keep the job moving with
BLAW-KNOX
CONSTRUCTION EQUIPMENT
The trouble-free equipment that Blaw-Knox makes is keeping vital construction jobs going at full speed . . . saving valuable days, weeks and months in the completion of projects necessary for victory.
Every day, construction records are being broken, and Blaw-Knox Construction Equipment helps contractors to do their part.
BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2067 FARMERS BANK BUILDING • PITTSBURGH, PA.
NEW YORK • CHICAGO • PHILADELPHIA • BIRMINGHAM
Representatives in Principal Cities

The open-top Transport truck mixer.

Open Truck Mixers To Speed Delivery

An open-top truck mixer, consisting of a stationary drum with revolving helical cast-steel blades attached to a central shaft of chrome molybdenum heat-treated steel by means of cast steel arms, is manufactured by the Concrete Transport Mixer Co., 600 Rosedale Ave., St. Louis, Mo. These Transport truck mixers are made in three sizes, 1-yard, 1¼-yards and 1½-yards, the rating being stepped up to 1½, 1¾ and 2 yards when they are used as agitators operating from a central mixing plant.

The mixer is built with a full open top so that the aggregates and cement may be charged into the mixer with a minimum of delay, and at the same time shrunk and mixed during the charging operations. These Transport mixers are built with as few moving parts as possible, of all-steel construction, and electrically welded. They are driven by a roller-bearing power take-off from the truck motor.

The truck mixers are equipped with both a rear swinging chute and a side discharge. When using the former method, concrete is discharged from a rear spout onto a 6-foot swinging chute which pivots so that it distributes the concrete over an arc of 180 degrees. The other method of discharge is to tilt the drum sideways, as shown in the illustration, by means of a dump rack and worm gear. Side discharge is ideal for flat work such as street widening, sidewalks, curbs, etc.

Complete information and a bulletin on Transport mixers may be secured direct from the manufacturer by mentioning this item.

Early-Strength Concrete

With "speed" the keynote of wartime construction, every man who works with concrete will be interested in having a copy of a new booklet recently issued by the Calcium Chloride Association, 4145 Penobscot Building, Detroit, Mich. Entitled "Early Strength Concrete," the Association states that it is the purpose of the booklet to explain the results secured by using calcium chloride in concrete and thus make possible more rapid and better-regulated concreting schedules.

It presents the latest data developed at the National Bureau of Standards on the effects of low temperatures and explains how to offset the retarding action of cold weather. Also included are authoritative research papers and many actual examples of practical concreting operations, with more than sixty photos, charts, graphs and tables.

Copies of this booklet may be obtained without charge by writing direct to the Calcium Chloride Association and asking for Bulletin No. 28.

Service for Buyers Of Seamless Tubing

The establishment of a new service whereby users of seamless steel tubing may obtain information on the availability of various grades and sizes for new or special wartime requirements has recently been announced by the Seamless Steel Tube Institute, Gulf Bldg., Pittsburgh, Pa.

This step has been taken for the benefit of two types of purchasers: first, those who have bought certain grades of tubing for use in peacetime products but may be unfamiliar with sources of supply for other or special grades of tubing required for war equipment; and second, manufacturers and contractors who never before needed seamless steel tubing. The latter applies particularly in the case of specialties not manufactured generally and available from only two or three mills.

The announcement of this service by the Institute follows numerous requests for such information received in frequent months. It is hoped by the Institute that its willingness to cooperate with tube purchasers in this manner will facilitate purchases and expedite deliveries of this important class of material.

Pumps, Hoists and Power

The latest Sterling construction equipment bulletin contains production capacities and illustrations of Sterling lightweight self-priming centrifugal pumps as well as the heavy-duty units, multi-stage non-self-priming pumps, self-priming jetting pumps, Sterling hoists, both single and double drum, ball-bearing saw rigs, Unitype power plants, and belt-driven sand pumps. Copies of Bulletin V will be sent free on request by the Sterling Machinery Corp., 405-13 Southwest Blvd., Kansas City, Mo.

The Original BucketruX

Trade DEMPSTER DUMPSTER Mark

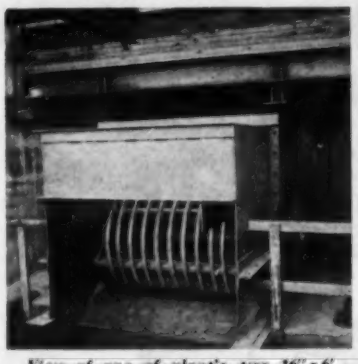
Reg. No. 353486

Mfgd. by

DEMPSTER BROTHERS, Inc.

Knoxville, Tenn.

WATER FOR NEW YORK CITY

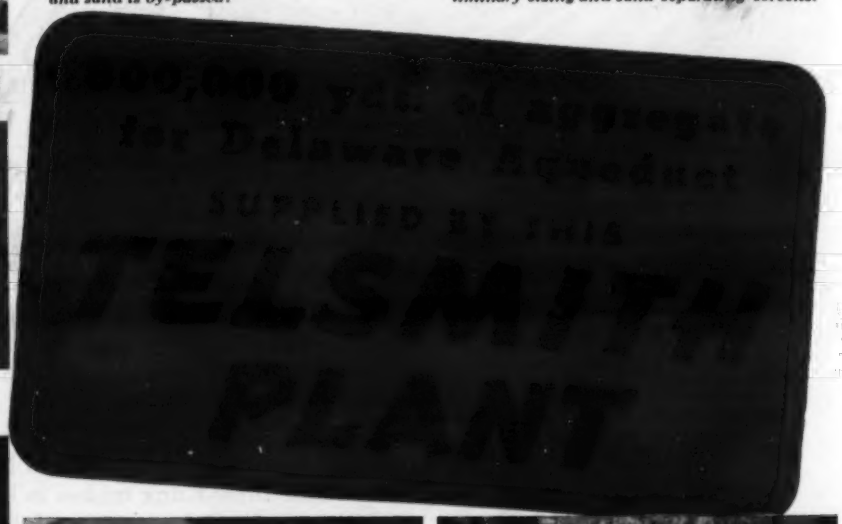


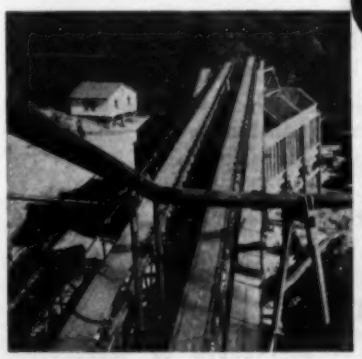
View of one of plant's two 36" x 6' Telsmith Reciprocating Plate Feeders, and No. 540 Telsmith Rotary Grizzly.

Plus 4" gravel goes to a No. 16-B Telsmith Gyratory Primary Crusher. Minus 4" gravel and sand is by-passed.

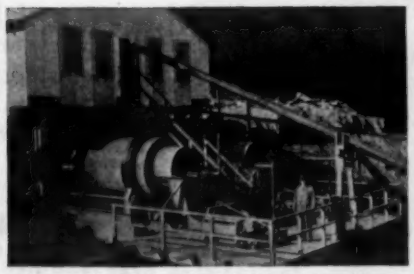
One 5'x12' Double Deck and two 5'x12' Telsmith Triple Deck Pulsators act as scalping, preliminary sizing and sand separating screens.

One of the two No. 36 Telsmith Gyrasphere Crushers producing minus 1½" or minus ¾" product as required.





Telsmith Steel Frame Belt Conveyors take finished sand and gravel to steel bins equipped with Telsmith Bin Gates.



Two 72" x 10'6" Telsmith Super-Scrubbers thoroughly clean the gravel, and eliminate any clay or soft stone.

Two 3'x 8' Telsmith Double Deck Screens rinse and size the gravel. The lower 1¼" deck dewaters the gravel.

Processing 800,000 cu. yds. of concrete aggregates for the big Delaware Aqueduct. And meeting the tough specifications of the New York City Board of Water Supply—1½" and ¾" gravel, and minus ¼" sand with no crusher grits. A big job! And it takes a big tonnage plant! The Rossoff Sand & Gravel Corp. has just such a plant near Kerhonkson, N. Y.

In co-operation with Mr. Samuel R. Rossoff and his engineers, this new and completely modern plant was designed by Telsmith. Telsmith built the machinery . . . supervised its installation . . . co-ordinating and balancing every unit. And the plant is turning out its required tonnage every hour. Telsmith sound engineering experience, Telsmith high grade equipment, and Telsmith centralized responsibility, here as in so many other plants, delivered all-around satisfactory results.

Are you about to build a new gravel pit, or quarry plant? Or planning to expand your present plant? Then it most certainly will pay you to find out about Telsmith complete plant service and equipment.

Get Bulletin G-34. Sent free, on request. G-4

SMITH ENGINEERING WORKS, 4014 N. HOLTON ST., MILWAUKEE, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

Room 1604—50 East 42nd St. New York City · 211 W. Wacker Drive Chicago, Ill. · 713 Commercial Trust Bldg. Philadelphia, Pa. · 19-21 Charles St. Cambridge, Mass. · Borchert-Ingersoll, Inc. St. Paul, Minnesota · Brandeis M. & S. Co. Louisville, Ky.

Charleston Tractor & Eqpt. Corp. Charleston, W. Va. · Roanoke Trac. & Eqpt. Co. Roanoke, Va. · North Carolina Eqpt. Co. Raleigh and Stateville, N. C. · Wilson-Weesner-Wilkinson Co. Knoxville and Nashville, Tenn. · G. F. Seeley & Co. Toronto, Ont.

Overhead Built for Railroad Entering New Bomber Plant

New Delivery Method for Ready-Mixed Concrete Is Feature of Industrial Access Road Job

✦ A NEW multiple-span steel, concrete and timber railroad structure 325 feet 8 inches long was constructed across a Federal route in the middle west this past summer to carry a spur track of the railroad into a new aircraft manufacturing and assembly plant being built by the United States Engineer Department, with three runways adjacent, for operation as a bomber plant and testing field. Two roadways pass beneath the main span of the structure, a 22-foot lane and a lane widened to 33 feet as an approach to the plant entrance just north of the structure, and a 22-foot pavement under each adjacent span.

The substructure and timber-trestle approach spans were built by the state highway department and the superstructure and track were furnished and placed by the railroad.

Design of the Structure

From west to east the structure comprises five wood pile bents with spans of 13 feet 2 inches, two of 13 feet 6 inches, one 19 feet 6 inches and one 14 feet 6 inches to Pier 6. Then there is a 45-foot I-beam span to Pier 7 across one of the 22-foot roads, then a 100-foot 6-inch through-girder span between Piers 7 and 8 crossing the two highways, an I-beam span of 37 feet between Piers 8 and 9 across another 22-foot side highway, and then Pile Bents 10 through 14 with spans of 14 feet, three of 13 feet 6 inches and the last span 13 feet 2 inches.

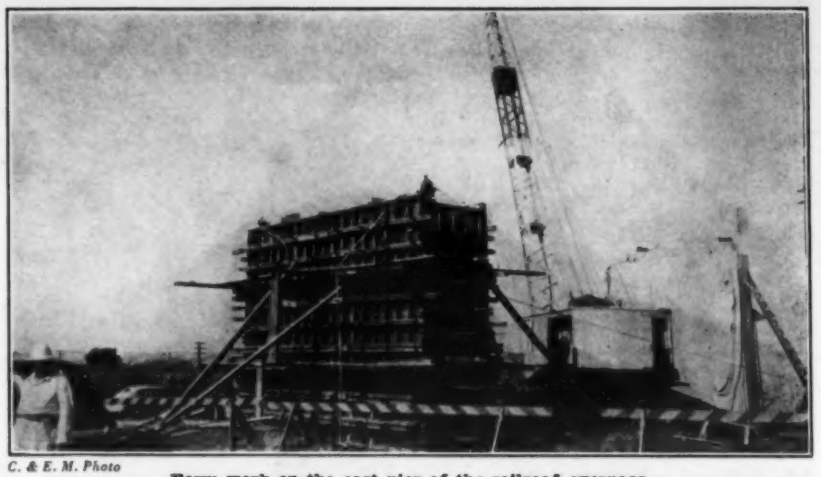
Bent 1 has eight piles while Bents 2 through 5 have six piles each. There are eighteen piles in the foundation for the footing of Pier 6, thirty-six piles for the footings of Piers 7 and 8, eighteen for Pier 9, and six piles each in Bents 10 through 13 and eight piles in Bent 14. The footings for Piers 7 and 8 for the 100-foot 6-inch span are 10 x 27 feet in plan and 3 feet 6 inches high, with the piles encased 1 foot in the footing. Piers 6 and 9 for the shorter main spans across the highways have footings 8 x 18 feet in plan and 3 feet high, with the piles cut off 1 foot in the footing.

The piers are solid, Nos. 7 and 8 having a base 23 feet x 5 feet 6 inches and 20 feet high with no batter. Piers 6 and 9 are 17 feet 4 inches x 4 feet and are 20 feet 6 inches high from the top of the footing and with no batter.

Forms for Piers

The pier forms were made in panels of 5/8-inch plywood with single 2 x 6 studs spaced 14 inches on centers and double 2 x 6 wales spaced 30 inches on centers, using double 4 x 6 wales for the bottom six. The entire form structure was tied with Universal form clamps, using 1/2 and 3/4-inch rods. The same side panels were used on the second pier but new end panels had to be built be-

(*Concluded on page 49*)



C. & E. M. Photo

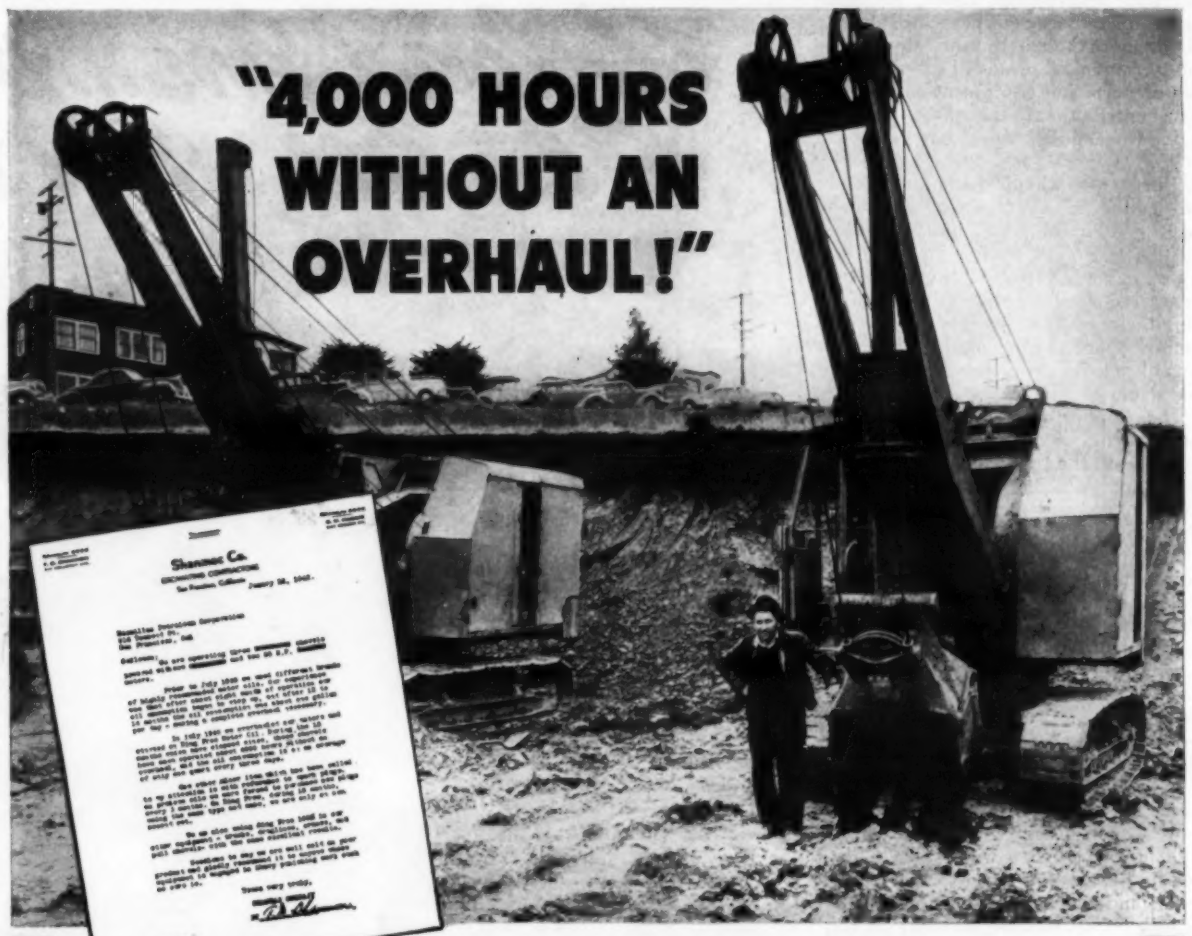
Form work on the east pier of the railroad overpass.

KINNEY DISTRIBUTORS

—already at work on vital airport jobs in the U.S.A., Cuba, Haiti, Guatemala and Brazil—

can help you with any bituminous surfacing job—and do it quickly and efficiently —write

KINNEY MANUFACTURING CO.
3531 Washington St., Boston, Mass.



THE EXPERIENCE of the Shanmac Company, excavating contractors of San Francisco was that prior to July 1940 they used different brands of recommended motor oils.

But after about eight months of operation, their oil consumption began to step up. And after 12 to 14 months the oil consumption was about a gallon a day—making a complete overhaul necessary.

"In July 1940 we overhauled our motors and started on RING-FREE Motor Oil," writes T. G. Shannon.

"During the 18 months which have elapsed since, our shovels have each operated about 4,000 hours without an overhaul, and the oil consumption is on an average of only one quart every three days."

On other oils they had to purchase new spark plugs every three months. On RING-FREE, they are on only their second set after 18 months.

"We are using RING-FREE 100% in our other equipment—trucks, draglines, cranes, and pull shovels with the same excellent results. Needless to say we are well sold on your product and gladly recommend it to anyone whose equipment is engaged in heavy, punishing work."

RING-FREE is the only oil you need, as Mr. Shannon points out, for all the different kinds of equipment used by contractors.

What RING-FREE has done for others, it can do for you. Write us!

* * *

MACMILLAN PETROLEUM CORPORATION
50 West 50th Street, New York · 624 So. Michigan Avenue, Chicago · 530 West 6th Street, Los Angeles

MACMILLAN RING-FREE MOTOR OIL

Copyright 1942 by Macmillan Petroleum Corporation

A field service truck equipped with Graco Convoy Luber for heavy-duty lubrication.

Mobile Lubricators For Field Service

The grease truck of the average contracting outfit is a miscellaneous assembly which neither permits speedy lubrication of equipment nor proper protection of the lubricants. Contractors and highway departments, facing increased prices for replacement parts, are already giving more thought to lubrication as the most economical means of extending the life of parts and equipment as a whole. As a contribution to this effort Gray Co., Inc., Minneapolis, Minn., has developed its Convoy Luber which is a heavy-duty mobile unit which permits pressure lubrication of all types of equipment right on the job. The units are completely assembled and shipped in one crate for immediate mounting on a truck or trailer. One type has built-in lubricant tanks for maximum capacity in a limited space, while another type permits dispensing lubricants from the original drum containers.

The hopper-type unit with built-in tanks is equipped with a heating chamber beneath the tanks to keep lubricants at proper viscosity in cold weather by means of exhaust gases piped from the air compressor engine. This unit has four pumps, two heavy-duty high-pressure pumps with a 50 to 1 pressure ratio for chassis lubricants and two volume pumps with 6 to 1 pressure ratio for gear lubricant and track roller lubricant. A tool box is furnished with each Graco Convoy Luber complete with hinged covers affording a handy place for carrying tools, spare parts, extra hose or supplies of all kinds.

Connected to each lubricant tank is a hose reel with locking brakes providing four 30-foot, high-pressure, interchangeable lubricant hoses with ⅜-inch bore, two for chassis lube, two for gear lubricants; and also a 50-foot air hose with a ¼-inch bore. All hose terminate in suitable control valves and proper adapters. The power plant of this lubrication outfit is a 12-cubic foot two-stage air-cooled air compressor with 175 pounds working pressure equipped with an automatic unloader and mounted on a 30-gallon air storage tank. It is driven by a 4½-hp single-cylinder air-cooled gasoline engine.

A complete description of all models of Graco Convoy Lubers will be found in Form 122 which may be secured direct from the Gray Co., Inc., Minneapolis, Minn., by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Elimination of Scaling Of Concrete Highways

The series of steps leading to the development of a product designed to eliminate scaling of concrete highways due to freezing and thawing has now been completed, and the patents covering the use of Vinsol Resin in cement have been dedicated to public use by Hercules Powder Co., Wilmington, Del. This material, a pine wood derivative, can be incorporated in the cement at a cost of a fraction of a cent a barrel of cement. Laboratory and field tests have determined that additions of extremely small quantities of Vinsol, in the range of 0.03 to 0.05 of 1 per cent, will produce concrete highly resistant to frost action.

Through the cooperation of the Portland Cement Association and highway boards of many states, field test data have been developed which have led many cement manufacturers to adopt the resin for their cement. The action of Hercules Powder Co. makes it possible for cement manufacturers to use Vinsol Resin in their cements without payment of royalties.

Complete line of
gasoline, pneumatic and electric driven concrete vibrators and grinders
Write for information and prices
ROETH VIBRATOR COMPANY
1737 Farragut Ave. Chicago, Ill.

PILE HAMMERS and EXTRACTORS
HOISTS—DERRICKS WHIRLERS

Special Equipment
Movable Bridge Machinery

Write for descriptive catalogs.

McKIERNAN-TERRY CORP.
19 Park Row, New York
Distributors in Principal Cities

Unload 'em...place 'em GET ON WITH THE JOB

Quickly, easily set in position by one or two men. Bethlehem Road Joints have equally strong support on each side of the filler mat so they won't tip over when the concrete is poured or finishing machine passes over them.

Bethlehem Road Joints come to you ready for instant placing, with dowels, caps, and chairs all assembled into one easily-handled unit. All you do is slip on the pre-cut fiber filler, set the assembly in place, and anchor with pins driven through the dowels. There's no time wasted locating, fitting and adjusting many parts together to form the unit.

Bethlehem Road Joints are made to hold their position, too. All dowels are shop-welded to steel spacing bars, parallel and carefully spaced. A third bar, welded to the tops of the dowels, stabilizes each unit and keeps the dowel firmly and accurately in place.

These dowels rest on the sub-grade with the base bars and form a solid support that resists displacement in any direction. Operators can drive finishing machinery over joints without displacing or disturbing them in any way.

Why not try Bethlehem Road Joints on your next job? See for yourself how they can speed up your placing, help you to finish contracts well within the time limit, and save you money as well. Phone or write Bethlehem Steel Company, Bethlehem, Pa., for more facts about them.

Bethlehem Road Steel Service

Many contractors avoid duplication of orders, as well as unnecessary accounting, letter-writing and follow-ups, by ordering all their highway steel through Bethlehem Road Steel Service:

Bar Mats Road Joints Reinforcing Bars
Dowels Dowel Bar Supports Bar Ties
Highway Guard Rails
Steel Highway Guard Posts
Guard Rail Anchor Rods
Bethlehem Beam Guard Rail
Bethlehem Sheet Piling and H-Piling

BETHLEHEM STEEL COMPANY

Improved Economies In Diesel Operation

All Lubrication Problems Of High-Speed Engines Are Reduced by Using the New Compounded Oils

✦ THE general interest in keeping diesel motive equipment operating efficiently for long periods at the lowest maintenance cost is due to the relatively large investment and greater cost of repairs. This is particularly true today because of the national emergency, with its attendant restrictions on availability of new equipment and repair parts. Now, more than ever before, diesel operators are interested in the most efficient possible operation of their equipment.

This discussion of the lubrication of diesel engines by H. G. Vesper, Manager of the Lubrication Division, Standard Oil Co. of California, is concerned mainly with high-speed diesels, that is with engines of 1,000 rpm or higher. However, the general problems of lubricating slower-speed diesels are similar although modified in degree. All diesels involve the same basic lubrication problems and answers.

Diesel Lubrication Problem

The diesel, because of its design, is just about the best possible set-up for oxidizing lubricating oil. Heat and air are the major enemies of lubricating oil, and the more heat that is applied to an oil in the presence of air, the greater is its tendency to oxidize and form sludge, gum and other contaminants.

In a diesel engine, for example, temperatures at the end of the compression stroke are much higher than in spark-ignition engines, due to greater compression pressures. These pressures average 450 to 550 pounds per square inch in comparison to 90-120 pounds per square inch in spark-ignition engines.

Due to the severe operating conditions of diesels, contaminating deposits resulting from the deterioration of the lubricating oil are generally formed at a comparatively high rate. These deposits form and stay in place on the hot metal surfaces or are carried in the oil stream. Efficient filters will remove them from the latter, but the former interfere with proper piston operation, affecting both oil distribution and engine compression. Such deposits tend to collect behind and around the rings, clog the oil grooves or holes through which the lubricating oil is supposed to return to the crankcase, and greatly interfere with heat transfer.

Another basic difference between diesel and spark-ignition engines affecting lubrication has to do with oil distribution over the cylinder walls. In spark-ignition engines, the existence of a partial vacuum in the combustion space during the intake stroke assists materially in drawing oil toward the upper compression rings. In diesels, however, atmospheric pressure prevails in both the combustion space and crankcase during the intake stroke; therefore, lubricating oil distribution throughout the cylinder is a greater problem in diesels.

Straight Mineral Lubricants

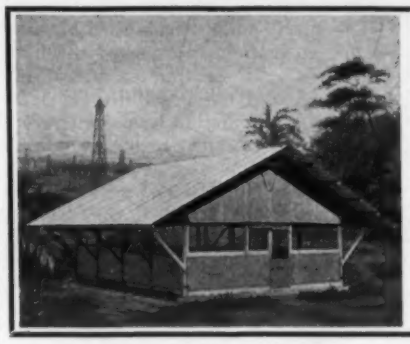
A lubricating oil has three major functions in an internal combustion engine—to lubricate, cool, and seal. The performance of these functions may be seriously affected by the presence of contaminants from outside or within the engine. In order to provide satisfactory lubrication for high-speed diesels, a lubricating oil must have maximum ability to resist deterioration due to contact with heat and oxygen and must possess maximum ability to stay on very hot metal surfaces. In addition, the oil must, of course, have the correct viscosity, low carbon content, low pour point, etc.

However, even the best straight mineral oil available today will not meet these requirements adequately. There has been a great advance during recent years in the technology of manufacturing lubricating oils, and the oils produced today in a modern refinery are infinitely superior in quality to those available a few years ago. Nevertheless, such straight mineral oils, while very much superior in oxidation resistance and in ability to lubricate hot metal surfaces than formerly, still do not come up to modern requirements on these points for the present day high-speed diesel. Such engines will operate with this type of oil, but for a much shorter period and at much higher overhaul and maintenance costs.

Use of Compounded Oils

The use of compounded lubricating

(*Continued on page 46*)



TROPICAL HOUSING

Contractors who have work in our southern states, tropical or semi-tropical countries should write for literature describing our 100% *Portable Houses*, which have been in use by oil and engineering companies since 1920. (Cubic measurement of the 18'x24' Portable House pictured here is 208 cubic feet boxed for shipment. Four inexperienced men can erect it in a few hours.)

MONROE CO., 50 Bridge St., COLFAX, IOWA

The most brilliant achievement in watch styling—

• One of the things that distinguishes Gruen Veri-Thin from all other watches is the design of its beautifully streamlined case. It is "faired" to the strap and to the wrist—is *50% thinner at sides and ends.* America's ten foremost fashion designers name it "America's best-styled watch!"

The most advanced development in accuracy—

• The movement of a Gruen Veri-Thin is a brilliantly simple solution of a difficult technical problem. The wheel-train is re-arranged to fit the case, to permit the use of rugged, full-size parts. This successful break with 300 years of watch-making tradition gives sturdy reliability and accuracy in a remarkably thin watch. See the new Gruen professional models for engineers, including watertights and many with full-sweep second hands — at your Gruen jeweler's now.

Gruen watches, at Gruen jewelers only, from $24.75 to $250; with precious stones to $4000. Write for free Folder "M." Prices include Federal Tax and are subject to change without notice. The Gruen Watch Company, Time Hill, Cincinnati, Ohio, U.S.A. In Canada: Toronto, Ontario.

GRUEN VERI-THIN

This diagram shows how the full-size, rugged working parts of the Veri-Thin‡ movements are brilliantly arranged to fit completely within the thin, curved case without sacrificing accuracy or dependability. By this ingenious arrangement of the wheel-train, it is possible to slope the case downward on both ends and sides for extreme thinness and streamlined styling.

* * *

‡Reg. U. S. Pat. Office. Patented U.S. Patent No. 2194452. Canadian Patent No. 389616. Copyright 1939, by The Gruen Watch Co.

A. VERI-THIN LEXINGTON — 15 jewels, luminous dials and hands, waterlight Guildite case $33.75

B. VERI-THIN AIRMAN — 15 jewels, pink or yellow gold-filled case, Guildite back, $37.50

C. VERI-THIN SPECIALIST — 17-jewel Precision* movement, pink or yellow gold-filled case, Guildite back $42.50

D. VERI-THIN CULVER—17-jewel Precision* movement, white Guildite waterlight case, matching expansion bracelet $49.75

E. VERI-THIN ASSOCIATE — 17-jewel Precision* movement, pink or yellow gold-filled case, Guildite back, matching expansion bracelet $55

GRUEN VERI-THIN

IT'S NOT A VERI-THIN UNLESS IT'S A GRUEN

★ BUY A GRUEN WATCH...BUT BUY A UNITED STATES SAVINGS BOND FIRST! ★

* REGISTERED TRADE MARK.

COPYRIGHT 1942, THE GRUEN WATCH COMPANY.

Carey Elastite EXPANSION JOINT

Standard in Concrete Construction for 26 Years

ECONOMICAL and EFFICIENT

Asphalt Joint • Rubber Joint
Non-Extruding Expansion Joint
Plate Dowel Expansion Joint
Sub-grade Felt

THE PHILIP CAREY MFG. CO.

Dependable Products Since 1873

LOCKLAND, CINCINNATI, OHIO

Concrete Dam Raised 31 Feet and Reinforced

Engineers, Ltd., Handled Enlargement of Alpine Dam in California for Marin Water District

By ASA G. LINDLEY

(*Photo on page 52*)

✦ THE raising of Alpine Dam in Marin County, Calif., an additional 31 feet presented problems in both design and construction which are not ordinarily encountered in new work. The primary problems included finding a method of bonding the new concrete to the old face which had set and hardened for many years, and proceeding with construction while the reservoir was filled, the latter being necessary because the reservoir is the principal source of water for 50,000 users throughout the greater part of the county.

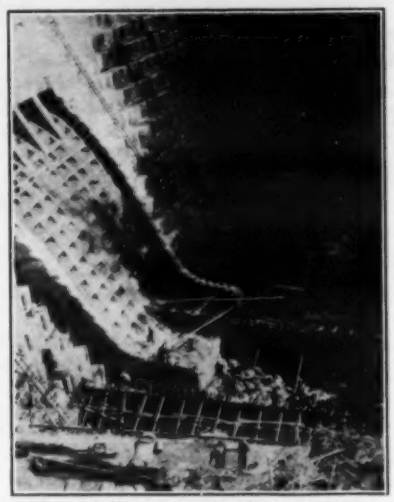
Alpine Dam is a concrete gravity arch structure located on Lagunitas Creek approximately 8 miles from the town of Fairfax. The contract for the work was awarded to Engineers, Ltd., San Francisco contractor, by the Marin Municipal Water District on August 2, 1940, at a price of $469,397. The plans called for thickening the downstream face by pouring a new concrete section, adding 31 feet to the crest, installing a new siphon spillway and new outlet control valves, and miscellaneous work. The new section has a downstream sloping face of 0.8 horizontal to 1.0 vertical, not including fillets, and varies in thickness from 10 to 48 feet, averaging 27.5 feet. The enlarged dam is arched on a 466.4-foot radius to the upstream face, and the work approximately doubles the reservoir capacity from its former 1,500,000,000 gallons.

Excavation Subcontracted

The excavation for the access roads and at the dam was subcontracted to Parish Brothers, Sacramento. The construction of the access roads, involving 20,000 cubic yards of earth moving, and the excavation at the abutments and foundations, which included 21,000 cubic yards of earth and rock, proceeded according to schedule. Excavation was started on August 14, 1940, with 14-yard LeTourneau Carryalls and Caterpillar D8 tractors, rooters, and tractor-bulldozer outfits handling most of the work. Later a Lorain 40 was used to handle rock.

The specifications prohibited blasting as the excavation approached the final foundations of the dam, a precaution taken to avoid the possibility of fracturing the foundation rock. Therefore blasting was confined to locations high on the abutments and above firm rock foundations. The material removed was wasted a short distance downstream.

As excavation approached final foundations on the south side a shear zone, of considerable size and extending under the old structure, was discovered and great care had to be exercised to insure the safety of the dam. Here Ingersoll-Rand Jackhamers equipped with gads and powered by Gardner-Denver 210-cfm compressors were used to knock out the rock. About 2,000 cubic yards of rock was removed by this method. When the rock failed to become dislodged by the jackhammers, it was considered that the foundation was satisfactory. On the north side, however, it was possible to shoot nearly down to the foundation, although in some cases they stopped shooting at depths of from 5 to 8 feet above ultimate bottom.



View of the reconstruction of Alpine Dam in California, showing the notches chipped out of the face of the old structure to provide bond for the new concrete being poured.

When the subcontractor reached ultimate bottom, the total common excavation had amounted to about 25,000 cubic yards and rock to approximately 9,000 cubic yards. Most of the work was carried on in one or two shifts; some was done in three shifts.

Preparing Old Dam

Meanwhile, Parish Brothers had several crews whittling away at another phase of the subcontract, that of preparing the face of the old dam. Before

(*Continued on page 34*)

1881—1942

CONTRACTORS' EQUIPMENT

WHEELBARROWS
HOISTS SCRAPERS
MORTAR BOXES
CONCRETE CARTS, BARROWS
CONCRETE MIXERS:
(BATCH AND CONTINUOUS)
MORTAR MIXERS
BRICK and TILE BARROWS
HODS
etc., etc.

Write for complete information, prices

LANSING COMPANY Products
"Keep Your Products on Wheels"
LANSING, MICHIGAN
Chicago New York Kansas City Boston Minneapolis Philadelphia San Francisco Los Angeles

READY FOR ACTION

in WAR PRODUCTION WORK
in DIGGING IRON ORE
in COAL FIELDS
in CONSTRUCTION WORK

Husky

—with rugged strength proven by the records of many predecessors, this PMCO Welded Dipper will give up to 30% more capacity to the shovel. Its box sectioned design and welded construction save weight—weight saved for increased pay load.

War production demands speed—speed with greater yardage per day with a PMCO dipper on the job.

PMCO
WELDED DIPPERS

We operate the largest and most complete manganese steel foundry in the United States

PETTIBONE MULLIKEN CORPORATION
Established 1880
4710 West Division Street, Chicago, Illinois

Preference Rating For Road Material Explained

Critical materials such as metals, burlap and rubber must not be used for highways or highway repairs when less scare materials can be substituted, it was explained recently by the Division of Industry Operations, War Production Board. An interpretation of Preference Rating Order P-100 has been issued to point out that highway departments which apply preference ratings under the terms of the order are subject to the general provision that scarce materials must be eliminated by change of design or substituted for whenever practicable.

A number of highway departments, it is reported, have been applying preference ratings under the Repair and Maintenance Order to obtain such items as metal culverts, metal road signs, rope or cable, metal guard rails, etc., when terra cotta, cement or wood could be used. The interpretation explains that application of preference ratings in such cases constitutes a violation of the terms of the order, and that preference ratings may not be applied under any circumstances to deliveries of rubber or burlap for highway maintenance, repair or operation.

Standards on Aggregates

The American Society for Testing Materials has recently published A.S.T.M. specifications and tests covering mineral aggregates. Issued to provide in compact form many of the more widely used tests to determine the quality of aggregates and including important purchasing specifications to cover the procurement of such materials, this publication contains 50 A.S.T.M. standards and is the first special compilation of specifications, definitions, and methods of sampling and testing mineral aggregates. While most of the specifications pertain to concrete and concrete aggregates and to road and paving materials, there are also standards covering lime, gypsum, masonry mortar, glass products, waterproofing and roofing materials.

Copies of this booklet may be obtained from A.S.T.M. Headquarters, 260 So. Broad St., Philadelphia, Penna. Price: $1.25.

New Bulletin on Engines

The complete line of Waukesha internal combustion engines of the oil, gas and gasoline types for all kinds of heavy-duty service is described in a new bulletin, No. 827-N, recently issued by Waukesha Motor Co., Waukesha, Wis. Illustrations in the early part of the bulletin consist of excellent photographs of the factory showing various assemblies and operations, followed by photographs of applications of Waukesha power in various fields with the specifications of the various types and sizes of engines employed.

Copies of this catalog may be secured by writing direct to Waukesha on your business or official letterhead and mentioning this item.

$50 a day is nothing to sneeze at!

THAT is the conservative estimate of saving of one Buckeye Spreader user. Others have said $1,000.00 a job, $25.00 a mile, 25% over other methods.

More than ever before, that means something. With the shortage of new machinery, highway officials must find cheaper ways to keep necessary roads in repair.

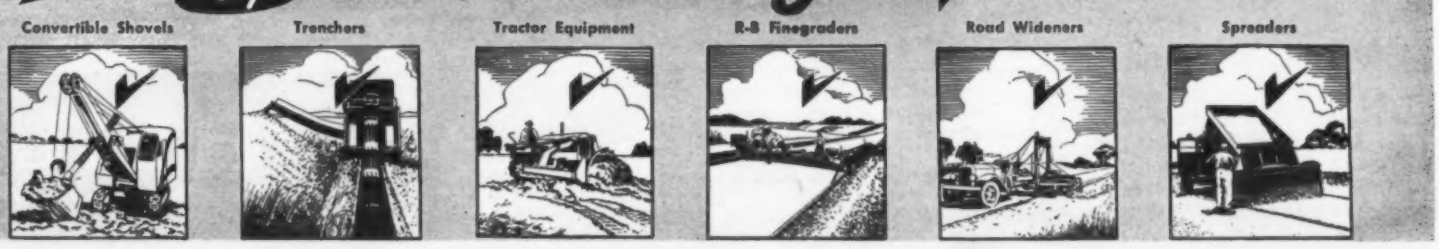
Buckeye Spreaders are the easy answer. Use your Buckeye Spreader for sand, chips—even No. 1 rock. The spirally fluted, transmission driven feed roll puts material down uniformly as to depth and volume, and a "strikeoff" is available for spreading courses of heavy stone up to six inches.

Before buying a spreader, check over the unusual Buckeye advantages listed to the right. They mean money saved on every job. *Further details will be gladly furnished on request.*

BUCKEYE TRACTION DITCHER COMPANY
Findlay • Ohio

- *Handles anything from a fine sprinkle of sand to a 1½" layer of stone.*
- *Spreads efficiently either forward or reverse regardless of truck speed.*
- *Handles wet or slightly sticky materials.*
- *Is quickly uncoupled or coupled to truck.*
- *Spreads close to roadside obstructions.*
- *Spreads chips of various widths.*
- *Can be put in neutral.*
- *Will taper spread.*

Built by Buckeye



Milwaukee Journal Photo

The new Nite-Hawk searchlight.

All-Use Searchlight Serves Construction

Both military and civilian requirements are filled by the new powerful portable searchlight announced by Lister-Blackstone, Inc., Milwaukee, Wis. This model, like the floodlight unit, is called the Nite-Hawk and is a fully self-contained source of light. It has a 24-inch searchlight with 3½ million candle power and throws an effective beam of light for one mile. Two 30,000-candle-power wide-angle floodlights are also mounted for use as auxiliary or general lighting. If desired, more powerful searchlights may be used with candle power up to 9,500,000 and effective lighting ranges up to three miles.

The manufacturer reports use of this machine to throw a long concentrated beam of light for laying a long stretch of pipe, for lighting the way for contractor's hauling units on cuts and fills, and on large grading jobs at airports.

Mounted on a two-wheel sprung frame and pneumatic tires the outfit is easily towed by an auto or small truck. A third retractable wheel allows the unit to be wheeled easily into position by the operator. Power for both the searchlight model and the regular floodlight model is supplied by a 14-hp Le Roi air-cooled engine equipped with an electric starter. A 5,000-watt self-regulating dc generator, connected to the engine, delivers current at 110 to 120 volts. The voltage is adjustable by means of a rheostat located on the control panel. In addition to providing light, the machine has a control panel with receptacles for operating small electric hand tools such as electric drills, saws and hammers.

Complete information with prices may be secured direct from the manufacturer.

Two Types of Tines On In-Place Mixer

The latest model of motorized Pulvi-Mixer made by Seaman Motors Co., Milwaukee, Wis., Model MHD-72, offers two types of tine construction. The coil-spring tine type has twelve rapidly revolving tines per foot of width to perform the mixing operation. On the other type the flat spring tines are separately curved to obtain a lateral movement of materials, adapting it particularly for abrasive and granular material.

These two types of tines and other features of the MHD-72, which has a cutting width of 75 inches, will be found in the latest Seaman folder. Copies will be sent promptly to our readers writing direct to the manufacturer.

New Welding Magazine

A new arc welding news magazine is being published by Hobart Brothers Co., Troy, Ohio, under the title "Hobart Arc Welding News". The editorial matter is made up from entries in the Hobart Arc Welding News Contest, letters to the editor, and articles by welding experts.

This publication will be sent free of charge to anyone interested in welding who writes to Hobart's Direct Mail Department and asks to be placed on the regular magazine mailing list. Please use your company or official letterhead and mention this item.

Cleaning Clogged Culverts

Culverts can and do become clogged with mud. Sometimes it is caused by too flat a grade and at other times by some obstruction which has suddenly reduced the flow and permitted the mud to deposit. The latest bulletin of Monarch Road Machinery Co., 329 Front Ave., N. W., Grand Rapids, Mich., describes the Morco mechanical mole, a one-man culvert cleaner which makes it possible with extension handles to scoop up and pull out mud and gravel deposited on the invert of a culvert.

Copies of this folder with prices will be forwarded immediately on request by the manufacturer to those mentioning this item.

IF YOU WANT POWER, DURABILITY AND EASE OF HANDLING—

use

HARDSOCG DRILLS & DIGGERS

WRITE FOR SPECIFICATIONS AND PRICES

Manufacturers of ROCK DRILLS since 1904

← Light-duty Demolition Tool for breaking up concrete floors or tearing down brick or concrete walls. You can drill holes to a depth of four feet with this model.

Lowest air-consumer → of any Clay Digger of its weight and size on the market. Gets amazing results in hard clay, hard pan, frost or shale.

HARDSOCG DRILL CO., Ottumwa, Iowa

HEIL HI-SPEED TRACTOR SCOOP *gives you* faster dirtmoving at lowest cost per yard

Heil Hi-Speed Tractor Scoop. 15-Yard Scoop pulled by 150 H.P. Heil Rubber-Tired Diesel Tractor.

Heil Hydraulic Trailbuilders and Bulldozers. Built in sizes for all Cletrac Tractor Models.

Speed up operations—Move bigger yardage, faster and cheaper—with Heil Hi-Speed Tractor Scoops

For faster dirtmoving and bigger yardage on long haul jobs, investigate the extra economies and profitable capacity of Heil Hi-Speed Tractor Scoops. These 15 Yard Units are quickly push-loaded in 40 to 50 seconds — they haul at travel speeds up to 20 M.P.H., depending on road and grade conditions — and they spread their loads quickly with a positive mechanical pushout action secured by tilting the floor of the bowl.

Quick acceleration and higher travel speeds insure faster operation — and allow users of Heil Hi-Speed Units to show a profit on jobs where slower earthmoving operations would not be practical. Consult the chart below and compare the Heil Hi-Speed yardages with those you are now moving with conventional equipment. With a 100 H.P. Crawler Tractor push-loading, you can expect to move the following "Pay Dirt Per Hour."

One-Way Haul	ROAD CONDITIONS* 100%	80%	60%
600 Feet	300 Cu. Yd.	240 Cu. Yd.	180 Cu. Yd.
1000 Feet	270 Cu. Yd.	216 Cu. Yd.	162 Cu. Yd.
1500 Feet	225 Cu. Yd.	180 Cu. Yd.	135 Cu. Yd.
2000 Feet	180 Cu. Yd.	144 Cu. Yd.	108 Cu. Yd.
3000 Feet	138 Cu. Yd.	110 Cu. Yd.	83 Cu. Yd.
4000 Feet	108 Cu. Yd.	86 Cu. Yd.	65 Cu. Yd.
5000 Feet	95 Cu. Yd.	76 Cu. Yd.	57 Cu. Yd.

*EXPLANATION OF ROAD CONDITIONS
100%—Good Haul Road—High Gear Output
80%—Fair to Good Haul Road—Some 3rd & 4th Gear Speed
60%—Fair Haul Load—2nd and 3rd Gear Loaded—3rd and 4th Gear Return

Above figures based on 12.5 Cu. Yd. "Payload"—50 Second Loading Time, and 35 Second Dumping and Turning Time.

Heil Twin-Cable Scoops. 6 to 25 Yd. Capacities for use with any make of Crawler Tractor.

Heil Hydraulic Dump Units, available in sizes and capacities for mounting on any make of truck.

THE HEIL CO.
General Offices: Milwaukee, Wisconsin

Streamline Grading A Wisconsin Highway

L. G. Arnold, Inc., Completed One Mile a Week on a Wide Right-of-Way from Gilman West to Chippewa County

RUNNING from seven days of bad weather which prevented all work the first week of the contract to grading an entire mile in four days outlines the story of L. G. Arnold, Inc., of Eau Claire, Wis., on the 5.649-mile grading and drainage contract west from Gilman, Wis., to the Chippewa County line on Wisconsin Highway 64. Work started June 2, 1941, and was completed within the 110 calendar days allowed in the contract. The section of Highway 64 included in the contract was in such bad condition during the spring thaw that it had to be closed to traffic. This is the first time in Taylor County that a road taken over by the state has had to be closed because of frost heaving.

The Job

The right-of-way on this contract averages 120 feet, with a maximum of 140 feet and a short section slightly narrower. The graded section is 47 feet wide, of clay, with 34 feet of sand and gravel cushion 18 inches thick and feathered at the edges. The road gravel to be placed on this road will also be carried the full 34 feet. The shoulders are 6 feet 6 inches wide on a 4 to 1 slope. The ditch is 10 feet wide, and the backslope is streamlined with a slope of not more than 2 to 1 nor less than 10 to 1. The top of the slope was rounded with a grader, and where the cuts were more than 3 feet high the contractor made it a practice to round the top of the cuts as soon as the work was started, using the Carryall scrapers on high cuts and the power grader where the cut was shallow.

The country through which this highway passes is generally of clay with some silt at the top, and down about 5 feet is a layer of hardpan. Except for the first week, when the road was drenched with heavy rains and became a quagmire, the weather was generally dry, even to leaving the grade rather dusty so that when rains did occur they were quickly absorbed in the "extra dry" soil and did not delay putting the equipment back to work.

Included in the work was a bridge with two 20-foot spans and a 30-foot roadway at the Gilman end of the work. The only relocation on the highway was at the east end, which required moving the railroad station at Gilman so that the highway could connect up with the main street of this small community.

Grading Operations

All of the grading was done with two RD8 tractors pulling 12-yard LeTourneau Carryall scrapers, with an Allis-Chalmers Model L tractor for pushing during loading. The dumped material was spread by a TD-40 International tractor equipped with a Bucyrus-Erie bulldozer. Slope trimming at the top and the general blading of the road was done with a Caterpillar No. 12 motor grader.

C. & E. M. Photo

The first bite out of a knoll for the widening of Wis. Highway 64 near Gilman.

The maximum cut on the job was only 4 feet, the greatest part of the excavation being in the ditches, the material from which was used to build up the grade. The maximum haul for the Carryalls was about 400 feet, but most of the work was almost a turn-around, taking the material from the ditch and placing it on the grade.

Handling Muck Holes

There were two muck holes on the

(Concluded on page 40)

THE ROAD TO TOKYO WILL BE "HARD GOING", TOO

...but we'll get through

The thousands of Marmon-Herrington "Heavy Duty" *All-Wheel-Drive* trucks and converted Fords in the armed forces of America and her Allies are accustomed to "hard going." They won't fail in the jobs ahead of them, no matter how difficult the terrain may be, for they have been *proved* in the most exacting civilian and military services for years before we actually went to war. Building and maintaining roads regardless of weather, clearing snow from the highways, transporting oil equipment across desert sands, in these and scores of other "worst jobs" they have established records of performance that will put them in the forefront of demand, again, when this war is won. Write or wire for literature. Cable address MARTON.

MARMON-HERRINGTON COMPANY, INC.
INDIANAPOLIS, IND., U.S.A.

No mud or snow too deep for the fleet of seven Marmon-Herrington *All-Wheel-Drive* converted Fords in Ionia County, Michigan.

MARMON-HERRINGTON COMPANY, Inc., Indianapolis, Indiana, U.S.A.

VIBER COMPANY CONCRETE
VIBRATION

MOST PROFITABLE FOR
REINFORCED CONCRETE BUILDING CONSTRUCTION

When the job calls for mass vibration—the Viber Vibrator at work above is your best bet. Especially made for walls over 10 inches thick, foundations, large girders thick floor slabs, columns . . . large reinforced concrete bridges, grade separations, concrete floor systems, concrete arches and rigid frame structures . . . in a word, for all concrete with large aggregate and low water-cement ratio.

Write for complete VIBER data TODAY!

VIBER COMPANY
726 SO. FLOWER STREET
BURBANK, CALIFORNIA

Test Sections Laid On Oregon Highway

(*Continued from page 9*)

Paris resistance cells will be installed in three selected slabs to determine moisture content at each inch of thickness. Thermocouples or resistance coils will be placed in the same locations to determine temperatures. For joint movement, brass gage points will be set for measurement by caliper. Observation points of a gage length of 5 inches are to be set, centered about the joint, with auxiliary gage points consisting of large roofing nails placed approximately 4 inches from each brass gage point, the latter set in the fresh concrete immediately after finishing. Readings of these points will record the slab movement, due to setting up of the concrete. There are also points for measuring the elevation of slab surface.

Average temperature will be measured by thermometers in wells one-half the depth of the pavement thickness. Permanent monuments will be set up on each side to measure the total movement of the sections. Bench marks will be placed every 300 feet so that the longest sights need be no more than 150' feet.

The Yett Contract

The contract for the 4-mile section awarded to Porter W. Yett included finishing of the grade and placing rock for the subbase. The latter consists of 4-inch rock on which was placed a minus 3-inch cushion course finished with a timber drag after the forms were placed.

The concrete aggregates were batched at a commercial ready-mixed concrete plant owned by the contractor and operated under the name of the Acme Red-e-Mix Co. This plant, which has been operated for some years, is adjacent to the new grade, being located approximately in the middle of the 4-mile stretch. The aggregates were hauled to the Smith 27-E paver in steel-body batch trucks.

The concreting would have been facilitated by a somewhat larger mixing outfit, as the one used did not have sufficient capacity to keep all parts of the work moving with perfect continuity. But in view of the moderate size of the project and the interruptions necessitated by all the variations because of the test sections, it was decided to push through with the equipment available.

The design of the two reinforced sections called for the use of wire fabric with 6 x 12-inch mesh, laid 2 inches below the surface of the pavement. On the first pass of the finishing machine, a special blade was inserted which routed off the surface to the proper level for laying the mat, which was placed after the second pass of the machine.

The contraction joints were placed at 15-foot intervals and were the standard dummy joint, using ¼ x 2-inch paper installed by a regular contraction joint cutter. The expansion joints were also of the standard type, some with and some without dowels, as specified. The longitudinal joints between strips are of the standard grooved type.

After the usual operations of finishing, the surface was gone over with wire brooms and then covered with canvas for curing. For stripping the forms, a simple but effective form puller was used, consisting of a 3 x 10-inch plank, 12 feet long, trimmed down somewhat at the outer end, and used as a lever. It was mounted in a pedestal fulcrum by means of a 2-inch pipe thrust horizontally through holes in the pedestal and level arm. On the short end of the

(*Concluded on next page*)

New Tractor Loader

A new model of the Athey Mobiloader for handling earth, sand, clay, gravel, and similar materials has recently been announced by the Athey Truss Wheel Co., 5631 W. 65th St., Chicago, Ill., as a companion model to the W4 Mobiloader.

The new Model 8 Mobiloader, which is designed for use with a Caterpillar D8 tractor, employs the same principle of operation as the W4, digging at the front and dumping overhead to the rear. It has bucket capacities ranging from 2.7 to 9 cubic yards, depending upon the type of material being handled.

Further information on this new Mobiloader may be secured by interested contractors and state and county highway engineers direct from the manufacturer by mentioning this item.

How to get the highest contraction joint performance at the *lowest cost:*—

SPECIFY

KEYLODE

CONTRACTION JOINTS

Easily Aligned
Designed for Speed
Work with Any Machinery
Hold their Alignment

WRITE FOR DESCRIPTIVE CIRCULAR

HIGHWAY
Steel Products Co.
CHICAGO HEIGHTS
ILLINOIS

"KEEP THEM ROLLING"
On Bituminous Roads Constructed and Repaired with LITTLEFORD EQUIPMENT

Photo by U. S. Army Signal Corps

Constructing and repairing Airport Runway Strips, Access Roads and Defense Roads is a job for a Littleford "Spray Master" Pressure Distributor. Speed and Efficiency are built into the "Spray Master" to save time in construction of so vital a program. The "Spray Master" will handle tar, asphalt, cut back, emulsion and road oil.

Sweeping Access Roads before applying materials make them last longer. Removing dust and dirt is the job of the Littleford Road Broom. Whether Motor or Traction Driven, speed of operation saves time on road construction jobs.

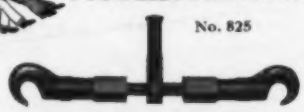
When the "Spray Master" is on the job, the Littleford Supply Tanks keep it in operation all day. These Supply Tanks, some of which have steam heating coils, supply the Distributor with material. Construction of Runways or Access Roads need not slow up when Littleford Supply Tanks do the hauling.

BLACK TOP ROAD MAINTENANCE EQUIPMENT
LB
SINCE - 1900
LITTLEFORD
LITTLEFORD BROS., INC.
485 E. Pearl St., Cincinnati, Ohio

Cut out the "Tug O' War"!

USE SIMPLEX PUSH and PULL JACKS

No. 825



They save manpower and eliminate hazardous make-shifts. Speed straightening and tying of piling and bents, erection of falsework, razing of walls and stacks, tying of forms for pouring concrete, tying of structural members during assembly and tensioning of guy wires. They save time and provide maximum safety on boiler, tank and heavy equipment rigging jobs — one man and a No. 1542 can skid 15-tons. Used with pipe, cable or chain.

Templeton, Kenly & Co.
Chicago, Ill.

Better, Safer Construction Jacks Since 1899

Simplex Jacks
A better Jack for every job — many jobs for every Jack

Close-up of an Ord finisher equipped with a Mall vibrator in action on the Lombard Highway in Oregon.

Lombard Highway Job Tests Joint Spacing

(*Continued from preceding page*)

lever a chain was hung, the end of which was made into a hook by bending a short piece of ½-inch steel at right angles. This was provided with a hole and slot through which the chain was drawn and made fast. With a leverage of 4 or 5 to 1, one or two men at the end of the lever arm easily pulled the outside forms. The inside forms, with a groove forming the tongue in the slab, was another matter and required preliminary loosening to free the tongue.

Dividing Strips

Intersections with the new highway are provided with islands and traffic-dividing strips of concrete. These were poured and ready before the paving reached these points, and are featured by the use of white concrete, made of white cement and white sand, which will do away with painting in maintenance. The dividing strips were first poured to within 6 inches of the top of the forms and then completed with the white concrete, and are 16 x 16 inches at the bottom beveled to 8 inches wide at the top.

No oil was permitted to be used on the forms. As soon as the ordinary concrete was in and before it was set, the remainder of the form was cleaned by scraping so that there would be no discoloration of the white surface concrete from that source. After the white concrete was poured, paper was used to cover the surface before putting on the mats; otherwise the wet mats would have stained the white surface during the curing process.

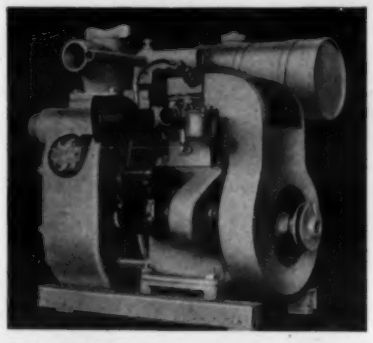
Personnel

This section of highway was built by the Oregon State Highway Commission, of which R. H. Baldock is Chief Engineer. E. A. Collier is Division Engineer of the Portland District and A. B. Dean was Resident Engineer on the project. The experimental work was under the direction of G. S. Paxson, Bridge Engineer for the Commission.

Tin-Free Solders

Tin, which is an essential war metal, has also been an essential ingredient of soft solders for many years. Now that war has cut off the principal source of tin supplies in the Pacific, every endeavor is being made to develop low-tin or tin-free solders.

The March 1942 issue of *Lead*, published by Lead Industries Association, 420 Lexington Ave., New York City, contains a one-page article, on page 3, on available substitute solders, with a table showing the composition of available low-tin and tin-free solders. Copies of this may be secured direct from the Lead Industries Association by referring to this item.



2" High-Pressure Pump

Light weight, high-capacity, self-priming

Delivers 65 gallons per minute against 50 lbs. pressure, or 50 gallons per minute against 65 lbs. pressure. Suitable for jetting piles, supplying water to concrete mixers through long pipe lines against high pressure.

Ask for bulletin describing high-pressure pumps.

Made by

MARLOW PUMPS

Ridgewood New Jersey

OSGOOD

TYPE 90

for Heavy Duty Work.

Built to give long, satisfactory service under hard rock conditions.

Write for details on Shovel, Dragline or Crane

THE OSGOOD CO. MARION OHIO

TRAVEL CLEARANCE FOR DEEP RUTS

High body travel clearance when loaded assures steady hauling over soft and rough haul roads. Reduction of hauling time is increase in loads per hour.

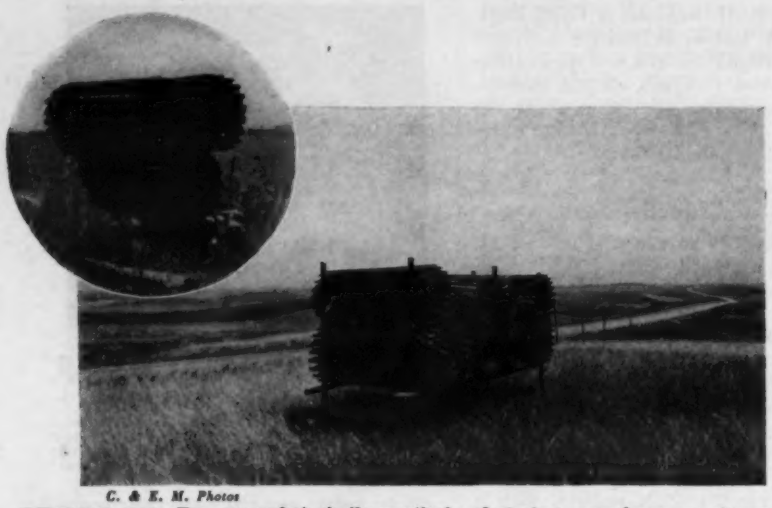
21" Body Travel Clearance Cuts Hauling Time

High loaded body clearance of the Koehring Wheeler permits uninterrupted hauling over deeply rutted haul roads. *Twenty-one* inches clearance, ample flotation and horsepower per gross ton load, are important Wheeler advantages for continuous high speed hauling over rough and soft haul roads. When traveling time is reduced, you get more loads per hour, more yards per shift. Koehring Wheeler Method of Moving Dirt reduces costs per yard and moves more dirt in a shorter time.

KOEHRING HEAVY DUTY

KOEHRING COMPANY · *Milwaukee, Wisconsin*

HEAVY-DUTY CONSTRUCTION EQUIPMENT



C. & E. M. Photos

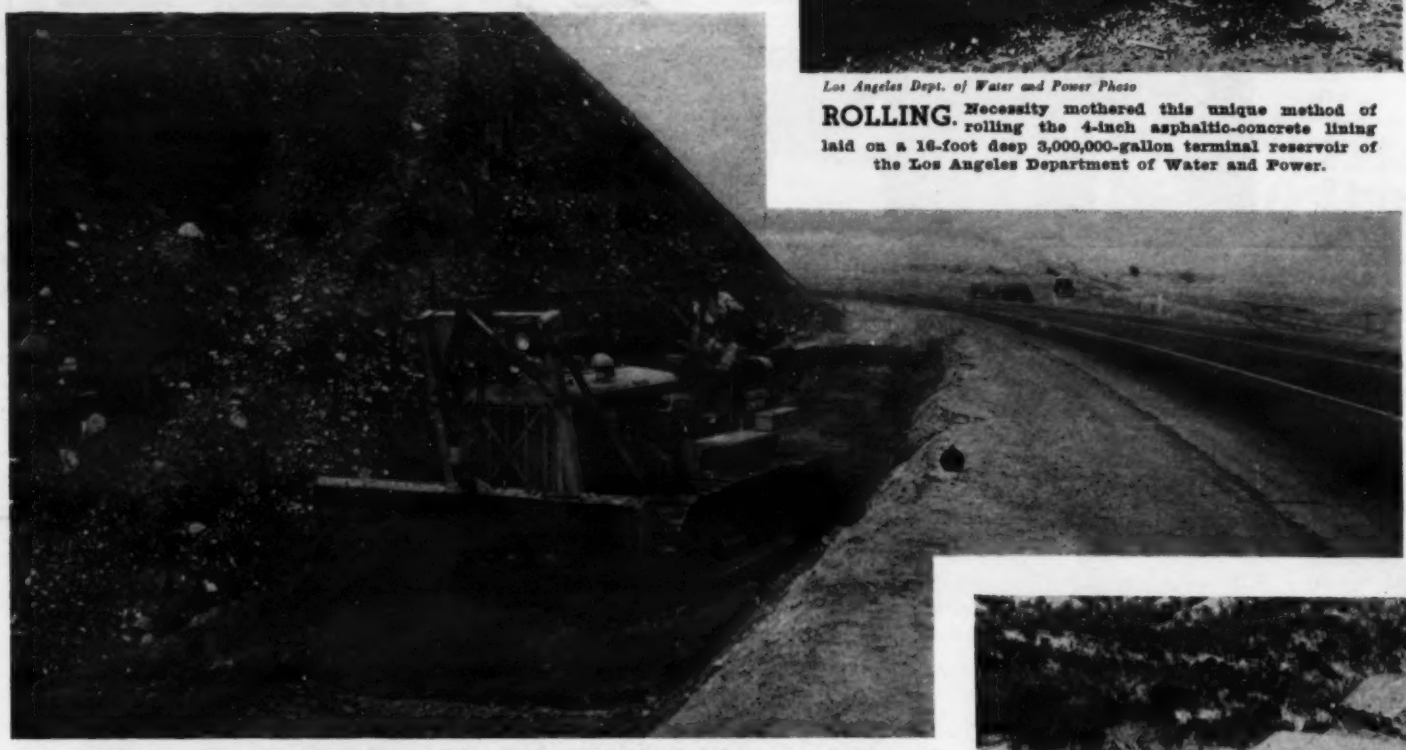
STORAGE. Two somewhat similar methods of storing snow fence are shown above. The double X method, making use of four steel posts to support three rolls (shown in the insert), was seen on Wisconsin 25 near Arkasaw. The C. M. St. P. & P. RR uses its pipe fence posts in the manner shown above to store fence well off the ground in South Dakota.

Los Angeles Dept. of Water and Power Photo

ROLLING. Necessity mothered this unique method of rolling the 4-inch asphaltic-concrete lining laid on a 16-foot deep 3,000,000-gallon terminal reservoir of the Los Angeles Department of Water and Power.

MARKER. The stone table [illegible] the right, bea[illegible] the inscription, "Kinkead, Rock[illegible] Evans, Builders, July 11, 19[illegible] appears on the old Stone Br[illegible] across the Youghiogheny River [illegible] Somerfield, Penna. Another tab[illegible] on the same bridge memorial[illegible] the Great Crossing, ½-mile dow[illegible] stream, used by General Washing[illegible] ton. *C. & E. M. Ph[illegible]*

HISTORIC. The old Stone [illegible] now carri[illegible] gheny River [illegible], Penna., w[illegible] by President James Madison. [illegible] pounded by the new Youghiog[illegible] the D. A. R. wante[illegible] bridge t[illegible]



WIDENING. Six miles of the famous Ridge Route, California 99, between Los Angeles and Bakersfield, was widened by the Griffith Co. of Los Angeles, a D8 tractor and LeTourneau bulldozer being used to level the fill from 428,000 yards of excavation.

VENEZUELA. J. A. Jones Construction Co. moved nearly 700,000 yards of well-packed gravel and jumbo shale to build an airport for Pan American Airways at Caracas, Venezuela. Tournapulls and 11-yard Carryalls with D7 tractors, one unit of which is shown at the right, worked two 10-hour shifts daily.

C. & E. M. Photos

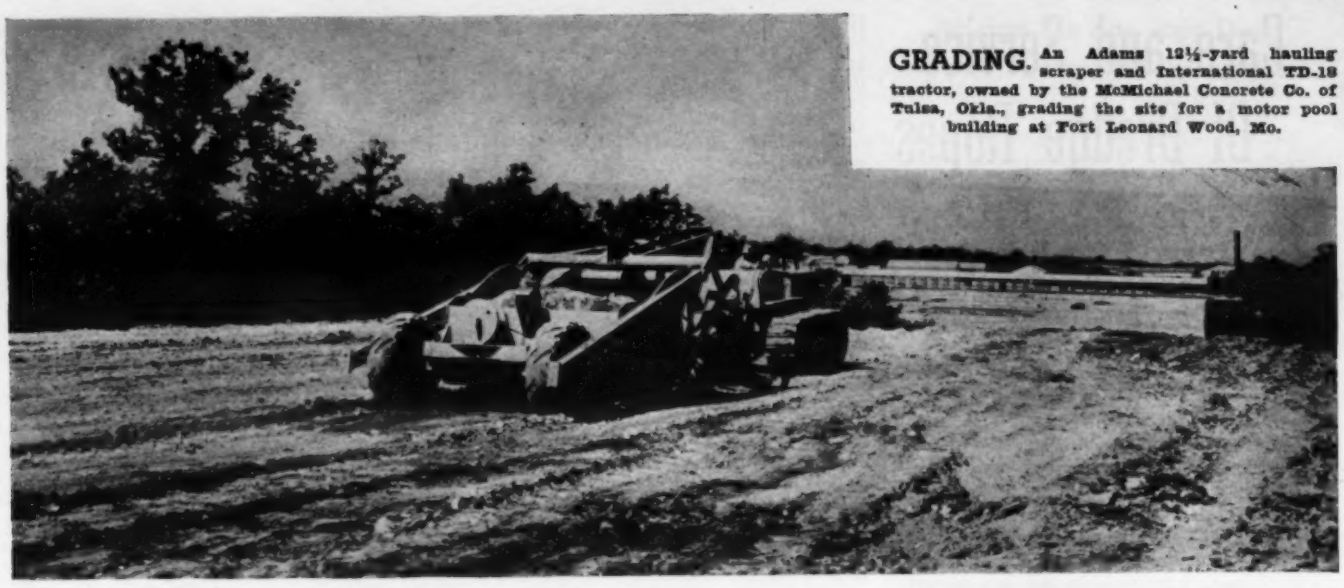
TYPICAL of many small bridges which are being widened in all parts of the country is this Minnesota concrete structure widened by Jahnig & Davis of Britton, S. D., from 37.5 to 45.5 feet, burying the old wing walls in the backfill against the new walls. Very good joints were secured between the old and new concrete, 18 cubic yards of new concrete being used at each side.

The forms shown in the photo at the left were 1 x 12-inch face lumber with 2 x 4 studs and 2 x 4 double wales. Heavy bar steel reinforcing was used throughout the widening of the structure.

Bureau of Re[illegible]

VOLCA[illegible] at left, [illegible] a volcanic [illegible] place cre[illegible] the concre[illegible] ing conc[illegible] Co. and [illegible] of Reclam[illegible] Central V[illegible] fornia. [illegible] place to [illegible] excellent [illegible]

...ow carries U. S. 40 across the Youghio-..., Penna., was built in 1818 and dedicated ...ructure will be covered by the waters im-...trol dam being built by the U. S. E. D., ...e bridge to another location.



GRADING. An Adams 12½-yard hauling scraper and International TD-18 tractor, owned by the McMichael Concrete Co. of Tulsa, Okla., grading the site for a motor pool building at Fort Leonard Wood, Mo.

C. & E. M. Photo

DITCHES. Wide flat ditches on an 11.91-mile grading job between Braham and Cambridge, Minn., were excavated by a Bucyrus-Erie 22-B dragline. An RD7 tractor with a LaPlant-Choate bulldozer is spreading the surcharge of backfill through the muck area. The contractor was Megarry Bros. of St. Cloud, Minn.

METHODS. Two interesting details of job methods on the Geo. H. Brewster & Son, Inc., concrete-paving job on N.J. Route 25. The waterproofing flashing inserted at the forms in the initial lane was opened up by the disk device, shown in the circle, so that the flashing cast in the adjacent lane would slip into it readily.

At right, slots were cut in the old concrete at frequent intervals for the paver hose.

Responsible for the job were H. A. Hartman, Resident Engineer, N. J. State Highway Department, (at left below), and B. H. Vogt, Superintendent for Geo. H. Brewster & Son.

C. & E. M. Photos

BUGGY. Perkins Battles of Randolph, Vt., carries the mail, come snow drifts or deep mud, in this snow and mud buggy equipped with used B. F. Goodrich airplane tires.

Bureau of Reclamation Photo

UNDER COVER. Heavy tarpaulin, in sections 65 feet long and 20 feet wide, covered a 380-foot length of the Pit River Bridge upper deck to protect the concrete-paving operations from winter and spring rains.

VITAL. Gravel is vital to war construction. Here a Bucyrus-Erie shovel loads 12 tons of gravel into a Dodge truck operated by the Service Rock Co., Riverside, Calif., which makes nine daily trips from the pit to March Field and Camp Haan.

Care and Service Of Dredge Ropes

Wire Rope on Dredges Perform Two Services, As Part of Dredge Itself And in Handling Bucket

By LEO M. GEISSAL, Sternberg Dredging Co., St. Louis, Mo.

✦ EVERY dredge owner and operator is anxious to obtain the maximum performance from the wire rope on his dredge, consistent with the maintenance of a high output. Dredge ropes represent a considerable investment, and their replacement constitutes a large item of expense. Economy in the use of wire rope can be achieved by taking certain precautions.

Selection of Rope and Sheaves

In the first place, the construction, grade and type of rope must be such as to give the best performance in that particular installation. Drums and sheaves should be large enough to avoid unduly high bending stresses in the rope wires. The operator himself should be able, by experience and temperament, to pick up a load and swing the boom with the minimum of damage to the ropes. Wherever practicable, ropes should be shifted to give a wider distribution to points of wear, and an effort should be made to use worn cable for those applications where it will continue to give service without constituting a hazard to men and equipment.

To illustrate how these suggestions can be applied to dredge operation, let us take as an example one of our dredges with a 240-foot boom and a 6-cubic yard bucket. The dead weight of the bucket is 30,000 pounds and the live load weighs approximately 3,000 pounds per cubic yard. On certain material which the bucket can penetrate easily, as much as 12 cubic yards can be handled at a single load.

For handling loads of this magnitude, at reasonable factors of safety, ropes up to 1½ inches in diameter and even larger are required. To minimize fatigue in the rope wire, the drums and sheaves should be at least 30 times the diameter of the rope, giving a value of at least 45

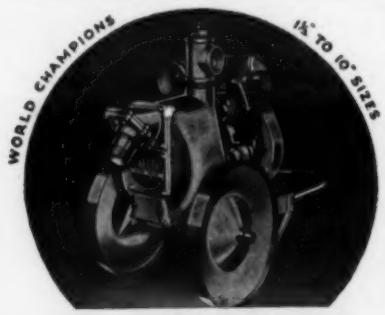
The dredge Conical, owned by the Sternberg Dredging Co. Wire rope is an important material in both the structure and operation of such dredges and its proper selection and care are vital to the efficient operation of these excavating units.

inches for the diameter of the drums and sheaves used with the largest ropes. Where the ratio of drum diameter to rope is much less than 30, the drum should be lagged if space will allow it. For ropes which are infrequently operated, such as spud ropes and boom holding ropes, we maintain a sheave diameter ratio of not less than 20. The relative infrequency of operation of these ropes assures them a long life, even when used with smaller drums and sheaves.

In the case of the closing sheaves on the bucket, these are necessarily small because of the limitations imposed by the bucket design. Therefore, in selecting the rope for operating over these sheaves, it is important to use rope with a high resistance to fatigue. For this purpose we specify preformed rope which has a longer life than we can get from non-preformed. This is explained by the fact that the wires in preformed rope are in a state of rest and do not contain unbalanced stresses, and therefore when this rope is subjected to severe bending, the wires and strands adjust themselves more readily to the contour of the sheave or drum and the total stress in the rope is not as high as if high unbalanced stresses were added to the bending and load stresses in the rope.

To support the holding and closing lines when they are carrying no load, three drums supported by 1½-inch pipe shafts are spaced along the boom and each suspended by four cables attached to the guy cables forming the top chords of the boom. These drums are provided

(*Concluded on page 32*)



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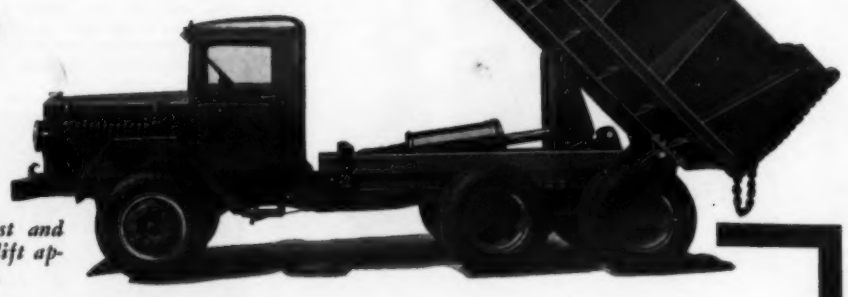

10X SPEEDRAULIC Hoist and 14 cubic yard body. Note lift applied at body center.

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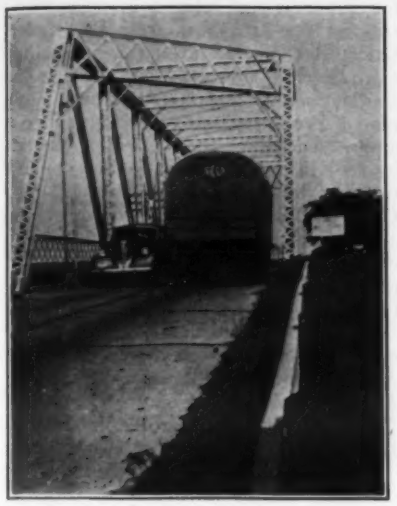

Bridge Engineering For Safer Highways

Old Bridge and Approaches Inadequate for High Speed Traffic: Reconstruction Cut Accident Toll to Zero

✦ A 2½-year record of twelve accidents, four fatalities and nineteen injured was held by a state highway bridge on U. S. 6 west of Wyanet, Ill. The structure was rebuilt and the approaches widened —result, 2½ years with no accidents, no fatalities and none injured. The cost of $124,000 for the improvement was fully justified on this record.

Before

The old narrow bridge had a restricted sight distance of 350 feet, creating a hazard and bottleneck on a highway carrying 2,400 vehicles per day. The roadway was only 16 feet 6 inches wide in the clear, and the outside dimension of the bridge was 18 feet, with an approach, between guard rails, of 26 feet. The character of the traffic is shown effectively in the "Before" photograph.

After

With the expenditure of $124,000, the bridge was widened, a pedestrian sidewalk placed on one side, the shoulders were widened on the approaches, and the sight distance was increased to 900 feet. The new bridge is 26 feet 2 inches wide in the clear, including the sidewalk, and the roadway is 22 feet wide. The approaches are now 40 feet wide between the guard rails, resulting in a structure that has proved its designed safety characteristics.

We are indebted to H. H. Harrison, Traffic Engineer, Illinois Division of Highways, for the illustrations for this item based on material appearing in the "Safety Bulletin" of the Division.

The old and new bridges over the Illinois-Mississippi Canal near Wyanet, Ill., showing widened approach and better sight distance, with decreased accident toll.

American Highway Policy

This is the title of a study recently prepared by Charles L. Dearing and published by The Brookings Institution, the purpose of which was to analyze the basic purposes and classify the principal beneficiaries of the several types of public roads and from this to formulate the principles which should govern the location of responsibility, the exercise of authority, and the distribution of the financial burden with respect to public roads.

The first two chapters trace the evolution of highway policy in European countries and outline the principal developments in American highway policy to 1916; Chapters III and IV describe the administrative and financial organization of modern road management in this country; Chapter V analyzes the basic purposes and beneficiaries of the public roads and attempts to identify the essential factors of road use and benefits that must be taken into account in the formulation of governing principles; the next chapter brings together this material and formulates general principles for the distribution of authority and responsibility among levels of government and of the financial burden among beneficiaries; Chapter VII deals with some of the issues affecting the general transportation problem; while the final chapter summarizes the conclusions and recommendations.

Copies of this 286-page volume "American Highway Policy" may be secured through this magazine or direct from The Brookings Institution, 722 Jackson Place, Washington, D.C. Price: $3.00.

Do your share in the fight for freedom. Buy U. S. Savings Bonds.

Marion Service Mgr. Dies

Ray L. Williams, Service Manager for the Marion Steam Shovel Co., Marion, Ohio, for the past ten years, died suddenly of apoplexy on March 5 at his home in Marion. He became associated with the company in 1910 as a clerk, for a short time was in the engineering department, and later became repair manager.

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This new portability greatly increases the scope that the Loader can cover. It practically obsoletes every other loading method. It makes every other means too expensive.

Simpler systems are now feasible. In highway maintenance, for instance, small roadside stockpiles at the job site can be put down in advance, loaded as needed with the Barber-Greene.

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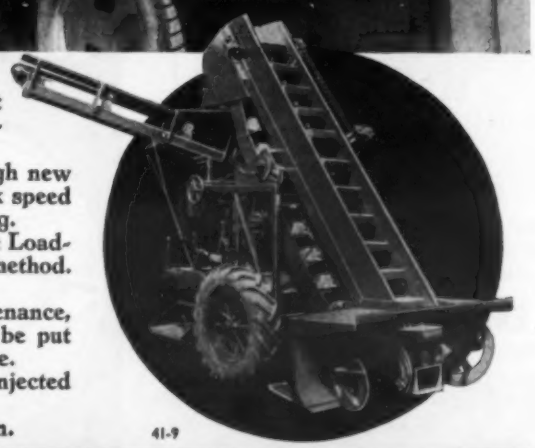

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BARBER GREENE

STANDARDIZED MATERIAL HANDLING MACHINES

AURORA ILLINOIS

Base Stabilization On Network Highway

(*Continued from page* 1)

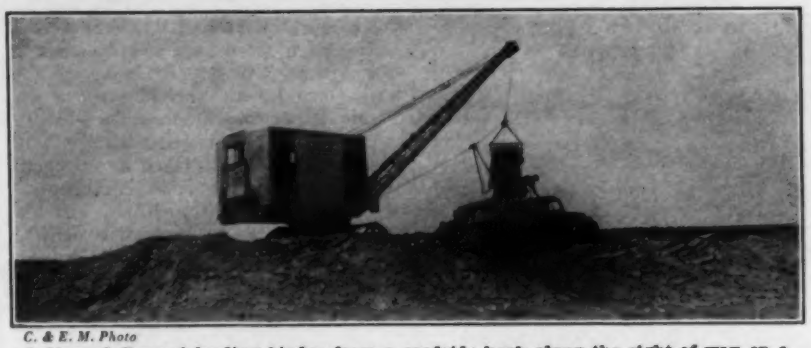
been dumped, the windrow was equalized with a Caterpillar No. 12 and then the blow-sand was dumped alongside it, equalized and pushed up against the gravel, following which the same method was used for the placing of the sand-gravel.

The binder material was handled slightly differently. It was produced on the job itself by loading from a bank of clay and silt with a very small proportion of sand, using a ½-yard General dragline loading to trucks. As soon as a truck was finished, two men climbed aboard and struck off the load uniformly to obtain the correct amount of material per station.

This binder material was spread adjacent to the windrowed material, and then thoroughly pulverized on the road by a Seaman Pulvi-Mixer driven by the power take-off of the D-4 tractor which pulled it. As soon as the material was thoroughly pulverized, a bench was cut from the windrow and the binder material placed on it by blading, and then the top pulled over so as to protect it from rain and to prevent the formation of clay balls which would not be thoroughly incorporated in the mix by the traveling mixer.

Mixing and Finishing

The windrowed material was thoroughly mixed with water by a Barber-Greene No. 848 traveling mixer, and later the same machine was used for mixing the bituminous mat. On the base, the machine traveled 4 feet per minute and mixed 3 yards per minute, adding water in the amount of 7 per cent by weight in the mix. Water was hauled from town in tank trucks as it cost only 10 cents per thousand gallons in the trucks, which was less than it would cost the contractor to pump from any other suitable water supply. Two 1,000-gallon tank trucks were used for this purpose, delivering the water to a 1,600-gallon tank underslung on a trailer which also carried a 3-inch Jaeger pump to move the water from the tank to the trailer tank, keeping the latter full against tank-truck delays. The trailer also carried a complete grease outfit for the traveling mixer, which was run 24 hours a day, and a Kohler 1,500-watt electric plant to furnish illumination in front of and around the mixer in order to maintain the daytime pace during the night.



C. & E. M. Photo

A ½-yard General loading binder from a roadside bank along the right-of-way on a strategic-network project in Nebraska.

Prior to the spreading of the mixed base material, the subgrade was scarified for 9½ feet on either side of the 10-foot center section to a depth of 2 inches for the outside 6 feet, tapering off to nothing in the inside 3½ feet. This material was then excavated with a special blade which acted as a template, and the material was moved out for use in building the shoulders. During this period the road was closed to all but local traffic. After the right half of the road had been excavated in this manner, it was sprinkled and compacted with Bros pneumatic rollers and then the windrow was placed in successive cuts in the excavated section by two Caterpillar No. 12 graders. Following this, the left side was excavated in a similar manner and the spreading completed. From the start of laying, a Bros double sheepsfoot tamping roller pulled by an RD6 tractor and two Bros pneumatic rollers, one pulled by an Allis-Chalmers farm tractor and the other by a Farmall tractor, were kept going over the surface. Toward the end of the compaction the sheepsfoot roller was removed and the whole surface was bladed lightly to take out the foot marks. Then rolling continued with the pneumatic rollers and was finished by a 4-foot diameter x 6-foot wide, 10-ton single-wheel Bros steel roller pulled by a Farmall M tractor.

Throughout this work the surface was sprinkled with a fog spray to prevent the top drying out. Both power graders used in the spreading operation were equipped with Slope Meters on the blades to insure the accuracy of the

(*Concluded on next page*)

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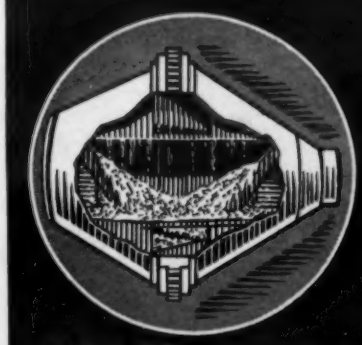

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Bituminous Mat Laid On Nebraska SN Route

(*Continued from preceding page*)

crown at all times during spreading. The rolling was continued until the material reached 100 per cent of the Proctor density.

Just ahead of the finish rolling by the steel-faced roller, the shoulder outside of the base was cut down 2 inches and to the exact shoulder slope of ½ inch in 12 inches by using another special blade on one of the power graders. This operation not only sloped the shoulder but also gave a neat trim to the 5-inch stabilized base. Then after the steel-wheel rolling or when there was a pneumatic roller to spare, one of the latter was put on the edge of the mat and the shoulder to tighten the edge. Following this, the material excavated from the subgrade was used to build up the shoulder against the base mat. The plans called for only 1 inch of shoulder building, but frequently it ran to much more, while with equal frequency it was necessary for the contractor to blade the excess material down the shoulder slope to waste.

The Bituminous Mat

Before the windrowing of the materials for the bituminous mat, the surface of the stabilized base was thoroughly cleaned and primed 30 feet wide by the contractor's own Etnyre 800-gallon or his Rosco 1,250-gallon distributor, using MC-1 asphalt at the rate of 0.33 gallon per square yard. The spray bars were set for 15 feet and the distributor went down one side and back the other so that the entire road was primed in one round trip. Following this, all traffic was forbidden the use of the road for at least three days. A trailer-mounted Grace Rapidfire tank-car heater was used to insure the proper temperature of all bituminous materials for transfer from the tank cars to the distributors.

The aggregates for the bituminous mat were chosen with equal care to that for the stabilized base. The specifications for the gravel and sand-gravel were identical for stabilized base and for the bituminous mat, but those for the natural sand and the filler material were slightly different and the specifications for the combined aggregates were different, as shown below:

NATURAL SAND

Retained on ¾-inch	0 per cent
Retained on No. 50	0-40 per cent
Retained on No. 100	25-90 per cent
Maximum passing No. 200	40 per cent

FILLER MATERIAL

The mineral filler material was required to consist of finely divided material free from injurious amounts of organic impurities and to mix easily with the other mineral aggregate to produce the per cent passing the No. 200 sieve as specified.

COMBINED AGGREGATES FOR
Bituminous Mat—Gradation B.

Retained on ¾-inch	0- 5 per cent
Retained on No. 10	30-60 per cent
Retained on No. 20	45-65 per cent
Retained on No. 50	60-80 per cent
Retained on No. 100	70-90 per cent

Where MC oil was used the specifications required that the material passing a No. 200 sieve should be between 7 and 15 per cent.

The four sizes or grades of material were hauled in and windrowed in the same manner as used for the base materials. The Barber-Greene traveling mixer added 5 per cent of MC-3 asphalt to the windrow, mixing 2 yards of material per minute. After mixing, the windrow was flattened to 10 to 12 feet wide by the blades and aerated by a spring-tooth harrow and an orchard cultivator to hasten the curing, which was shorter the higher the temperature. If a rain threatened, the material was immediately windrowed and a shoe run over the top to tighten the mix so that it would shed water. After the material was thoroughly aerated and the flux reduced to the proper amount, the material was spread 24 feet wide and 2 inches thick and rolled by the Bros pneumatic-tire rollers and finished by the steel-wheel roller.

The Armor Coat

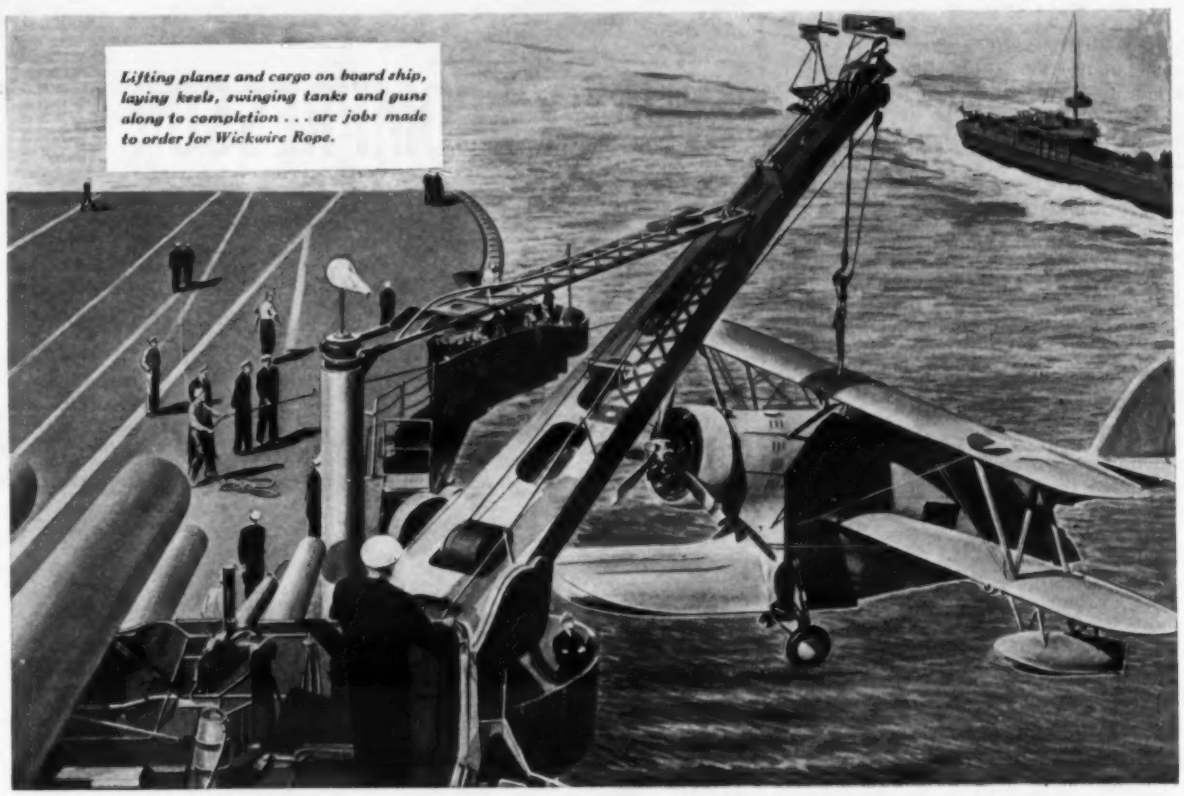
After the bituminous mat had set for about two weeks under traffic and was thoroughly cured, it was ready for the armor coat. The specifications for the armor-coat gravel were the same as for sand-gravel, except that the maximum retained on a ⅜-inch sieve was specified as 5 per cent and the material retained on a No. 20 between 70 and 95 per cent, thus greatly reducing the amount of sand in the aggregate.

After cleaning, the road received a shot of 0.3 gallon per square yard of RC-3 asphalt, immediately after which a Buckeye spreader was used to apply 130 cubic yards per mile of the armor-coat gravel. This was dragged with steel brooms on a floating frame to spread the material uniformly for 3 days and during the period was rolled by the pneumatic units. Material was added where any bleeding showed and the total result is a smooth uniform-texture non-skid surface on a strong base adequate for heavy traffic.

Personnel

The contract for the construction of 10.4 miles of stabilized base with prime coat, bituminous mat and armor coat, known as Nebraska Project SN-5 (7), and Project 5-F-2, was awarded to Lee & Johnson, Inc., of Sioux City, Iowa, on its bid of $96,635.50 and was completed within 90 working days. J. M. Gribble was Superintendent and L. M. Hughes, Assistant Superintendent, for the contractor. For the Nebraska Department of Roads and Irrigation, L. K. Barnhill was Project Engineer.

C. & E. M. Photo
Trimmed edge of the finished 5-inch stabilized base before tightening the edge with a pneumatic roller.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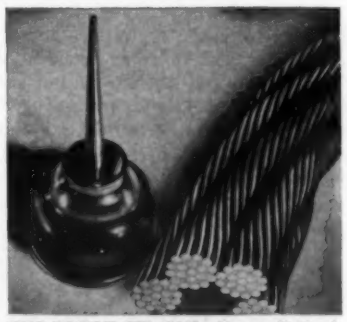

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WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

WET *Jobs?*

Dry Subgrades Guaranteed with

GRIFFIN WELLPOINT SYSTEMS

Whether you Buy or Rent!

BOTH Equipment and Dry Jobs are Guaranteed — Let us prove that GRIFFIN EQUIPMENT IS BETTER!

GRIFFIN WELLPOINT CORP.
881 EAST 141st ST. NEW YORK, N. Y.
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Proper Care Increases Dredge Rope Service

(*Continued from page 28*)

with flanges. As the lines run over these drums, every point in the line is subjected to a series of reverse bends, since each line bends in one direction on top of the drum and in the reverse direction at the bottom of each catenary between drums. To avoid the rapid fatiguing action which generally accompanies reverse bends, the drums are made quite large, with a 30-inch diameter.

Wherever abrasion is a serious factor, we use Lang lay rope, since rope of this construction has a greater resistance to abrasion than does regular-lay rope. Also, the material of the wires is an important factor in abrasion. Practically all of our ropes are of improved-plow-steel grade, which provides the greatest resistance to abrasion and also gives extra strength.

Care of the Rope

Since the bending stresses at the bucket end of the closing line are much larger than those at the drum end, fatigue breaks develop in the wires at the bucket end much more quickly than elsewhere in the rope. When this end becomes too damaged for further use, we crop it off, re-reeve the rope through the bucket, and re-attach it to the dead-end fastening. While the dredge is in operation, we cut off an average length of 15 feet on every seventh day. After the end has been cropped three or four times, we change the rope end for end and then crop three or four more times. When the rope has been shortened to about 450 feet, it has received considerable wear along its entire length and it is then discarded. By this method we get an average of about 60 days' service from one of these ropes.

The greatest wear on our swing ropes is at the take-up sheaves. When a rope has to be replaced, we cut out the bad section, leaving a length which, when combined with the remaining length from one of the old swing ropes, gives a rope that is sufficiently long for this service. These two sections of old rope are attached at their ends by means of a steel strap with a wedge socket at each end. When the rope is in place, the strap comes at a point on the bull wheel where it will not interfere with the operation of the rope. Also, the two ropes used on each of the two side spuds are cut from old 1⅝-inch preformed closing line ropes, thereby saving the investment in new ropes for this purpose.

The Human Element

One experience we had with this dredge illustrates the importance of the human element in rope service. Some time ago, we put a new operator on the dredge and immediately our swing ropes began wearing so rapidly that they lasted only about 12 days. With training, this operator improved the performance of these ropes, and it wasn't long before he was getting about 60 days' service out of new ropes. This shows the difference between smooth pick-up and acceleration, and jerky operation.

Effect of Working Conditions

In selecting rope for dredges and finding methods of increasing rope service, each application must be considered solely on its merits, since there is a wide difference in design and operation in various dredges. Even with the same dredge, ropes and methods that give best performance under one set of conditions may be entirely unsuitable under others.

However, the fundamentals of rope selection and operation do not change and if these are understood it should be possible to obtain maximum service from every dollar of rope investment.

Pipe Culvert Study

Bulletin 153 recently issued by the Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa, reports an investigation by M. G. Spangler, Research Engineer, of flexible pipe culverts made of corrugated metal and under high earth embankments. Design data for calculating the supporting strength of flexible pipe are developed in the bulletin from both theoretical analysis and field experimentation.

Single copies of this 80-page bulletin may be obtained without charge from the Iowa Engineering Experiment Station by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

AMERICAN Safety-ized Pneumatic-tired **WHEELBARROWS**

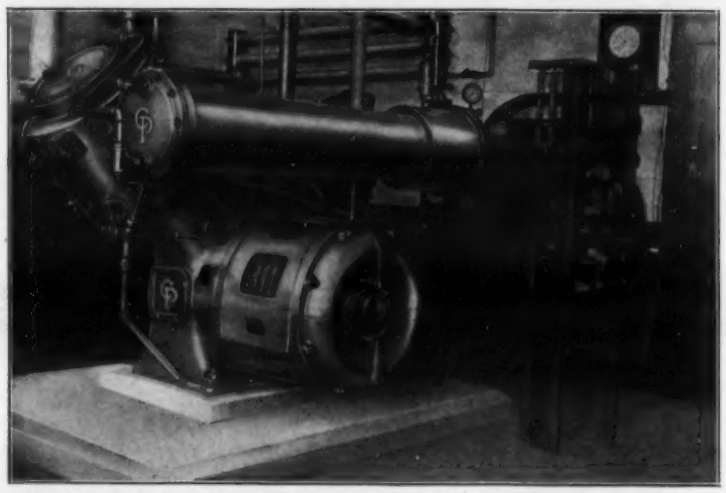
You can help conserve steel and rubber for National defense by confining your wheelbarrow specifications to one of the SIX STANDARD NUMBERS in our NEW WHEELBARROW BULLETIN. One of these six numbers will fit into your job, and give you long wear that will surprise you. Your American *Safety-ized tires* will last twice as long as *ordinary* pneumatic tires; and, as you know, pneumatic-tired barrows outlast ordinary *steel*-tired barrows many times!

WRITE FOR BULLETIN

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

★ ★ ★ ★ CHICAGO PNEUMATIC NEWS ★ ★ ★ ★

TYPE "Y" COMPRESSOR QUICKLY INSTALLED



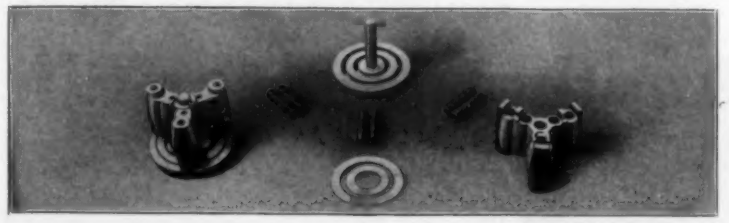
SHIPPED INTACT, REQUIRES ONLY SIMPLE FOUNDATION

Takes Minimum Floor Space

NEW YORK — Shipped intact, quickly installed with only a simple, inexpensive foundation, CP Type "Y" Compressor solves the problem of the new plant that must have air quickly. Extremely compact and requiring small floor space it is ideal for the crowded plant that must have additional air capacity. Chicago Pneumatic Type "Y" Compressors are of the heavy duty double-acting type. Two-stage units are available in capacities of 300 to 900 cubic feet per minute, 80 to 125 pounds pressure, with built-in or coupled induction or synchronous motor, or with V-belt drive. Units for other pressures are also built.

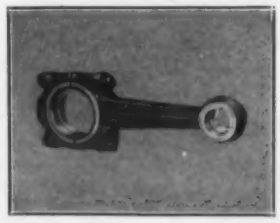
↑ **LONG LIFE AND LOW MAINTENANCE** costs are built into the CP Type "Y" compressor. Double-acting cross head construction, cylinders of wear-resisting semi-steel, low air velocities, forced feed filtered lubrication and CP Simplate Valves insure dependable, low cost operation.

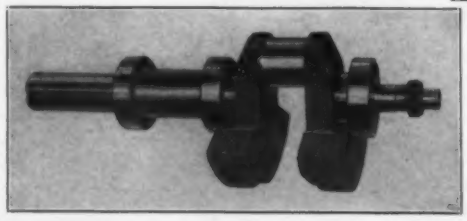
BECAUSE OF ITS ANNULAR PORTS and straight uniform lift, Simplate Valves possess the greatest effective area for a given valve diameter. This results in low air velocity and minimum total valve clearance, affording low power consumption and high volumetric efficiency. ↓

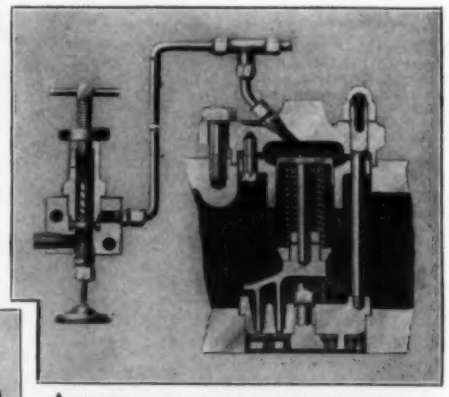


CONNECTING RODS are drop forged, heat treated alloy steel, rifle-drilled for pressure lubrication. Cross-head end is fitted with a solid bronze bushing; crank pin end, with a shim-adjusted, bronze-backed, babbit-lined split bearing. ↓

THREE SELF-ALIGNING SPHERICAL ROLLER BEARINGS support the precision turned and polished crankshaft. Accurate counterbalancing of the shaft and the 90 degree angle between cylinders assure exceptionally smooth operation. ↓







↑ **THREE-STEP CAPACITY REGULATION** is standard. It permits operation at full, half and no loads with maximum efficiency. Automatic start-and-stop control, or a combination of it with three-step regulation, can also be provided to meet an intermittent demand.

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Concrete VIBRATORS

AND GRINDERS

Write for Circular on types, sizes and prices

White Mfg. Co.

ELKHART INDIANA

A rear view of the Bros Model 67W rubber-tired roller.

An Improved Roller With Wobble Wheels

The one objection to pneumatic-tire rolling in the past has been that the equipment left ridges in the material being compacted. This was due to the fact that, even with the front and rear rows of tires staggered, there were some intermediate areas which were not completely compacted.

Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn., has equipped its Model 67 pneumatic-tired roller with wobble wheels which do not roll in a straight line but weave down the road just enough to eliminate ridging. No added strain or wear is imposed on the tires and bearings because the wheels track freely and easily in winding paths without scuffing and the wobble is only 1 inch laterally per tire.

The new Bros roller has thirteen instead of the usual nine tires, rolls a width 84 inches wide, is all steel, electrically welded, with a body 7 feet 4 inches wide, 9 feet 3 inches long, and 45 inches high. A low center of gravity is obtained by the dropped center.

Complete information and a copy of Bulletin 388 describing and illustrating the new Model 67 will be furnished free on request to readers of CONTRACTORS AND ENGINEERS MONTHLY referring to this descriptive text.

Industrial Traffic On Access Highways

An important phase of highway construction at the present time and of paramount importance to our war program is providing access roads to military and naval reservations, defense industries and sites, and to raw material sources.

G. Donald Kennedy, State Highway Commissioner of Michigan, speaking at the 28th Annual Meeting of the Michigan Highway Conference on February 19, 1942, pointed out the extent of industrial traffic at 741 war production plants in Michigan. This study, which was conducted by the Michigan Highway Planning Survey, shows that 100 of these production plants receive 100 per cent of their materials by truck, while 111 of the plants ship 100 per cent of their products by truck, and 72 plants receive and send out all freight by truck. The average of the percentages for all plants is 65.2 per cent for incoming freight and 69 per cent for out-going freight which is handled over the highways and streets of Michigan. Every one of these 741 plants uses trucks for at least some portion of incoming or outgoing freight.

Of equal, if not greater, importance is the extent to which the workers at 749 Michigan war production plants depend upon highway transportation to reach their jobs. In a study of this larger group of plants, there was found to be a total of 434,683 employees, of which 326,000, or 75 per cent, depend upon their automobiles for transportation to and from work. In 51 of the plants there are nearly 66,000 workers who depend 100 per cent upon their automobiles. In every city where these plants are located, more than 60 per cent of the workers depend upon automobiles for transportation to and from their jobs.

Commissioner Kennedy points out that these figures show clearly the part highways are playing in our war program and the job we have before us in seeing there is no bottleneck in highway transport.

Worth 12 Billions On 23rd Birthday

The gasoline tax reached its twenty-third birthday on Wednesday, February 25, and up to that time American highway users had contributed $12,000,000,000 to it, of which approximately $10,000,000,000 was collected by the states and about $2,000,000,000 by the Federal government. The gasoline tax was inaugurated by the Oregon State Legislature and became effective February 25, 1919. Within ten years the levy was adopted by all states and in 1932 the Federal government inaugurated a duplicating tax on gasoline.

For the first time since its inception, the American gasoline tax finds itself in a war economy. Revenues of the states from this levy, instead of expanding as in the past, may contract for the duration of the war because of rationing of tires and automotive products. Conservation of tax revenues by the states is needed. The trend toward dedication of special automotive taxes for road purposes, as now provided in the constitutions of eleven states, should be speeded and expanded. The need for sound policies of highway finance, taxation and administration is greater than ever, and states with large highway indebtedness should take steps to stabilize their financial position.

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PUNCTURE SEAL COMPOUND
for pneumatic tires

—"a friend indeed" in this hour of need!—

Write for circular

Tires going—going—gone? Make ALL your tires last much longer by putting SAFETY-IZE in the tubes.

SAFETY-IZE, in your tires, will be ALWAYS ON THE JOB to plug and seal punctures, extending the life of the tires by guarding against under-inflation.

SAFETY-IZE MFG. CO., 2814 Fullerton Ave., Chicago

It's no part-time job that those of us behind the lines are working on—it's one that demands maximum output from every machine and every piece of equipment. Time and productive capacity are wasted when equipment lies idle or isn't used to the best advantage—*and we can't tolerate waste now.*

In the material moving field—whether it is earth, rock, or mine products—Euclids have proved their extra speed and capacity and their trouble-free performance in non-stop production. That's the kind of efficiency that is imperative today, and that's why we believe every owner should "keep the 'EUCS' rolling" day in and day out.

If your Euclids have finished their part of a job, arrange to move them to another one without delay. Should you have no immediate use for your Euclid equipment, you can render a real service in the war program by leasing or renting to a contractor who has urgent need for hauling units. Let us know if you have Rear-Dump or Bottom-Dump EUCLIDS to lease or rent, or if you need additional units for a current or future job. We'll try to help by acting as a clearing house for this information.

★

Euclid Distributors in every section of the country, as well as factory parts depots at Cleveland, Memphis, Hibbing, and San Francisco, are ready to help "keep the 'EUCS' rolling" for peak production by supplying replacement parts and service promptly.

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CRAWLER WAGONS · ROTARY SCRAPERS · TAMPING ROLLERS

Preparing Concrete For Dam Enlargement

(*Continued from page 20*)

the mass concrete of the addition was poured, ribs 1 foot wide and 30 inches deep were constructed on 20-foot centers on the face of the old structure. The tops of these ribs were finished smooth. Then the addition was poured, resting on the ribs. The smooth joint was provided so that volume change in the concrete due to shrinkage as the mass cooled was provided for in a sliding joint. The slots formed between the ribs and between the old and new concrete were filled in when the crest of the addition reached the crest of the existing dam, as by that time the temperature of the new concrete had lowered sufficiently. This affected the final bond between the old and new portions. The mechanical bond at the joint between the old dam and the addition was provided by notches about 9 inches deep, chipped out of the face of the existing structure, and by roughening. Steel 1¼-inch anchor bars were cemented into holes drilled 5 feet into the old concrete, and were embedded an equal distance into the addition. These were spaced an average of 30 inches between centers horizontally and on 5-foot centers vertically.

As the preparation for concreting was part of Parish Brothers' subcontract, they put crews to work with chippers on the stepped face of the old dam to form the notches and to do the necessary "roughing up" of 26,700 square feet of the dam face, while drillers went to work on the anchor bar holes. In addition, there was another 10,000 square feet of surface which had to be roughened on the inside of the old siphon conduits.

Aggregate Production

Work proceeded simultaneously on another part of the job, with crews erecting the aggregate and batching and mixing plants. A good formation of basaltic rock exists above and slightly downstream from the right abutment, and it was possible to locate the aggregate plants about 100 yards distant and at a slightly lower elevation than the quarry, with the batching and mixing plant above the right abutment and about 50 yards from the aggregate plant. Thus all aggregate handling proceeded from high to successively lower elevations, making for easier handling and less wear and tear on the equipment, as well as saving valuable time.

Aggregate production was subcontracted to Hein Brothers of Petaluma, who erected the plant which produced four sizes of crushed rock and sand in the following gradings: 3 to 6 inches; 1½ to 3 inches; ¾ to 1½ inches; ¼ to ¾ inch; and sand below ¼ inch. Four Ingersoll-Rand Jackhamers, supplied with air by two compressors, one a Gardner-Denver 105-cfm unit, were used to drill to depths ranging from 16 to 20 feet, with the holes on variable centers, depending on the character of the rock. Five or six holes were drilled at a time, and then loaded with 40 or 60 per cent Atlas dynamite which was detonated electrically.

A Speeder ⅝-cubic yard shovel loaded the rock to Ford and Mack trucks which delivered it to the aggregate plant. Although the plant as designed included washing equipment, the character of the aggregate made washing unnecessary and it was remodeled for dry processing.

From the plant the aggregates were hauled by truck to the Noble automatic batching plant equipped with a Toledo Printweigh two-ribbon recording system. This unit had a capacity of 60 yards an hour, and discharged to two 1-yard Smith mixers.

Concreting

Engineers, Ltd., which handled the concreting on this job, used prefabrication of forms to as great a degree as possible, establishing a form construction yard near their offices on the right abutment. A DeWalt 10-inch radial saw and a Walker-Turner 16-inch band saw were kept busy. Water-resistant Plycrete Plyform in 60 x 96-inch panels was used for form facing.

A high line, consisting of a 1½-inch Roebling wire rope, a track cable and a ¾-inch load line, was suspended over the dam site to carry the 3-yard Gar-Bro bucket for placing the concrete. The cableway, originally operated by a 25-hp steam engine, was powered on this job by a 112-hp electric motor. The concrete bucket was dropped to a platform below the discharge of the mixers, filled, and transported to the pouring site.

Initial pouring was done in blocks in the bottom and part way up the left abutment. The blocks averaged 35 x 30 feet in plan, and were poured in successive 5-foot lifts. The form panels in the slot, which corresponds to the upstream face, were re-used in some cases and in others were left in place, due to difficulty of access. Panels on the downstream face were erected for two lifts, one above the other, at one time; then the lifts were poured and the panels moved up. The concrete was consolidated by Viber machines.

The surface of the concrete was kept continually wet by spraying with water until the new concrete was poured or for a period of at least 14 days. A system of 1-inch cooling pipes was installed and cold water from the reservoir was

(*Concluded on next page*)

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Asphaltic paving materials that meet all specs.

From pit-to-pit or job to job at truck speed.

Set up ready-to-go in 15 min.

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Users report fast production of quality SC-3, MC-2 and RC-4 mixes.

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is "Keeping 'Em Rolling" around Helena, Montana. Secondary roads and streets are being surfaced with 2½" of dense-graded plant mixed bituminous macadam by Lewis and Clark County. Specifications call for 60 to 70% fines, to produce denser mixes, and SC-3 oil.

For speed and economy on small contracts, maintenance and patching jobs put a "Twin Dryer" to work—"hypes" up distribution, so vital to Defense!

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"Twin Dryer" at right is producing asphalt mix for maintenance of roads and streets around Seattle, Wash. Send for Bulletin No. 57.

Speed up construction of airport runways and aprons, black and white top and oil mix roads, camp walks and drill grounds with Spreaderollers. See proof of its performance in Bulletin 800-A.

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3,000 WATT as illustrated on Pneumatic Tires $445.00

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Long Island City, N. Y.

A Water-Supply Dam Raised and Enlarged

(*Continued from preceding page*)

circulated through the system for about 30 days, after which refrigerated water was pumped through for an additional 25 days, the exact number of days depending on the time of year and the water temperature. This brought the concrete temperature down to about 50 degrees F., which is 3 degrees below the mean annual temperature in the vicinity. A York refrigeration unit was used for the second cooling stage.

The contraction joints are located on radial lines at about 45-foot centers. As the mass cooled, it was estimated that the joints would open up about 0.1 inch. Grout will be placed in the joints at predetermined pressures after the shrinking occurs. The grouting system used is a special feature developed by Ray L. Allin, Hydraulic Engineer for the District and Consulting Engineer on the construction of the addition to Alpine Dam.

Stresses, based on a full reservoir with gravity action on the sections between vertical radial planes, gave zero stress at the heel, including uplift, and 0.1 gravity for horizontal earthquake to 130 pounds per square inch compression and 104 pounds per square inch shear at the toe, not including fillets. The corresponding stresses with the reservoir empty were 133 pounds per square inch compression at the heel to 3 pounds tension at the toe. When the joints in the completed structure are grouted, changing it to an arch gravity dam, these stresses will all be changed.

Quantities

The original estimates called for 20,000 cubic yards of concrete in the dam, 5,000 yards to form the impervious surfaces, 3,800 yards in the slots, 850 yards in the concrete plugs for the siphon spillways, and 1,050 yards of miscellaneous concrete, totalling 30,700 cubic yards. Actually a total of 36,000 cubic yards was required. The contractor bid the common excavation at $1.60, the rock excavation at $4.75, and the concrete in the dam proper at $7.45 a cubic yard. Other quantities included in the work were 38,000 barrels of portland cement, 140,000 pounds of reinforcing steel, and 160,000 pounds of anchor bars.

Personnel

The plans and specifications for the enlargement of Alpine Dam were prepared by J. S. Peters, Chief Engineer and General Manager for the Marin Municipal Water District, and by Ray L. Allin, Consulting Hydraulic Engineer, assisted by H. C. Platt, J. H. Williams, F. Van Ogle, R. Gilman and E. Catey. Howard C. Platt and J. H. Williams were Construction Engineers.

Oscar Thompson was in charge of operations for Engineers, Ltd., of San Francisco, general contractor for the work, assisted by Richard Cuthbert, Engineer. For Parish Brothers of Sacramento, subcontractor on excavation, Harold Parish was Superintendent.

Timber Structure Designs

State and county highway department engineers are now faced with the necessity of designing needed bridges, culverts and similar structures without the use of steel and other materials essential to war production, and are turning to the use of timber. To aid in the solution of timber designing problems, the Timber Engineering Co. has just published a booklet "Typical Designs of Timber Structures," containing 48 detailed drawings selected by Teco engineers from a collection of several hundred designed in the course of practical work on actual timber engineering problems.

These typical plans cover fourteen different types of timber design, including bridges, trusses for hangars, and other structures. In the back of the book are handy tables for use in timber design, taken from the National Lumber Manufacturers Association publication *Wood Structural Design Data.*

Copies of "Typical Designs of Timber Structures" may be secured gratis direct from the Timber Engineering Co., 1337 Connecticut Ave., Washington, D. C., by readers of CONTRACTORS AND ENGINEERS MONTHLY.

New Chain Belt Dealer

Chain Belt Co., 1666 W. Bruce St., Milwaukee, Wis., announced recently the appointment of Pecaut Industrial Supply Co., 1819 E. Fourth St., Sioux City, Iowa, as distributor of Rex construction machinery in the Sioux City area. This line includes mixers, pavers, Speed Prime centrifugal pumps, Moto-Mixers and Pumpcrete units.

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Model 210 Compressor

WRITE FOR BULLETIN No. 4260

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LEADERS IN DRILLING EQUIPMENT

The Barber-Greene asphalt finishing machine laying a 2-inch asphalt course on top of the 2½-inch sand-asphalt base at the Oklahoma City Airport.

Obstacles Overcome On Airport Project

(*Continued from page 2*)

Work hummed along for a time until unusually heavy rains, sometimes of flood proportions, interposed during October and November. The heavy rains at times presented almost insurmountable obstacles. During a period of 50 days there were only eleven days in which major construction operations could be carried on. Rainfall in October, up to the 30th, totaled 9.91 inches, whereas the normal expected average for that month is 3.13 inches.

After each heavy rain, there was a delay of about four days before work could be resumed on the field. If it had not been for a good subsurface drainage system previously laid by the grading and drainage contractor, even greater delays might have occurred. As it was, however, the contractor was able to get the remaining surface water off the field by ditching, and without the use of pumps. A sandy loam soil also helped to speed up putting heavy equipment back into operation. The contractor also gained time by doubling the tractor equipment on some machines and by working longer hours.

Runway Paving

Original plans called for the construction of four runways but failure to secure sufficient funds to carry out the full construction program at this time forced curtailment of runway construction to two, one 3,975 feet long x 150 feet wide and the other 3,775 feet x 150 feet. These and one of the taxiways were constructed of sand-asphalt. City officials were assured that the type of asphalt pavement approved will hold up under the heaviest commercial airplanes now being operated in and out of Oklahoma City.

The Class A-1 soil made it possible to secure a well-stabilized base for the runways at a minimum expense. The top 6 inches of the soil is a sand-clay loam, which was compacted by Wylie-Stewart Machinery Co. sheepsfoot rollers, and by two pneumatic rollers pulled by Model H International and Caterpillar D6 tractors, with a minimum of six passes.

On this base 6 inches of sand-asphalt pavement was placed in three layers 2½, 2 and 1½ inches thick. The layers were spread by a Barber-Greene asphalt finishing machine and rolled by a 10-ton Erie roller. The finishing machine laid the asphalt at the rate of 80 to 120 tons per hour, working from the center outward in 11-foot strips.

The Asphalt Plant

The Barber-Greene asphalt plant was located near the center of runway construction operations. It has a maximum capacity of 120 tons per hour but sometimes, due to the high moisture content of the sand, it had to be operated at lower capacities. Sand was hauled from the Makins sand pit, 2 miles from the scene of construction, in 1½-ton GMC, Chevrolet and Ford trucks, and stockpiled near the plant. The asphalt was hauled from a refining plant near Duncan, Okla., about 100 miles from the airport site, by General Construction Co. trucks, and was stored in a 14,000-gallon tank at the plant.

The sand was pushed to the cold material hopper and chain-bucket elevator by a bulldozer on a Caterpillar RD8 and was fed to two driers, each about 20 feet long, driven by a Buda gasoline engine. Operated at temperatures of from 250 to 300 degrees Fahrenheit, the driers were equipped with a 1 to 500-degrees Fahrenheit thermometer installed at the discharge end of the drier system. The liquid asphalt was delivered to the weigh

(*Concluded on next page*)

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Covers all phases of arc welding. Explains newest techniques, materials, procedures. Makes an expert better, gives beginner all information he needs.
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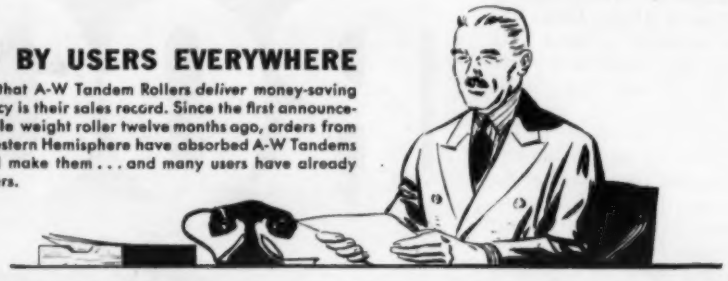
APPROVED BY USERS EVERYWHERE

The best evidence that A-W Tandem Rollers *deliver* money-saving speed and efficiency is their sales record. Since the first announcement of this variable weight roller twelve months ago, orders from all parts of the Western Hemisphere have absorbed A-W Tandems as fast as we could make them . . . and many users have already placed repeat orders.



SHOWS UP BEST at the SHOWDOWN

● Here's a roller you can count on for fast, economical performance season after season. Its many refinements in design make this smooth performing A-W Tandem a preferred machine for accurate roller work.

With an A-W Tandem your operator can work closer to curbs because visibility is better, there is less frame over-hang, and more ground clearance under side plates. More convenient controls, with reversing clutch lever mounted on steering column, combine with effortless hydraulic steer to save time and increase efficiency. It changes direction—forward or backward—with that vibrationless smoothness that means a better job and less wear and tear on the machine itself. A lower center of gravity prevents side sway.

A-W variable weight Tandem Rollers are built in 5 to 8 ton and 8 to 10½ ton sizes. Write for complete information on advantages they'll give you on the wide variety of jobs a tandem is called upon to handle.

THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois

MOTOR GRADERS • BLADE GRADERS • ELEVATING GRADERS • SCRAPERS • CRUSHING AND SCREENING PLANTS • ROLLERS
ROLL-A-PLANES • MOTOR SWEEPERS • SHOVELS AND CRANES • SCARIFIERS • DUMP CARS • TRAIL CARS

"FLEX-PLANE"

Finishing Machines

and

Joint Installing Machines

FLEXIBLE ROAD JOINT MACHINE CO.

Warren, Ohio

Runway, Apron Paving At Municipal Airport

(*Continued from preceding page*)

bucket by a Kinney 2-inch centrifugal pump from the storage tank, the flow being controlled by gates and a metering system. The mix consisted of 5.1 per cent asphalt and 94.9 per cent sand by weight. The bitumen content varied not more than 0.1 per cent as checked by extracting the bitumen with carbon bisulphide.

A 75-hp steam boiler furnished steam for the entire plant. The pugmill was driven by a D6 diesel engine and a 4-cylinder Wisconsin air-cooled gas engine operated the screening plant. Blowing of fine sand about the plant was reduced by a canvas cover on top of the 25-ton storage and screening bin.

Concrete Aprons

There are two concrete aprons, each about 150 feet x 150 feet in dimensions, which will serve two hangars and are connected by an asphalt taxiway about 75 feet wide and 530 feet long. Dirt space will be left between the hangars which later can be filled in to complete a longer apron for a large central hangar.

A concrete taxiway 600 feet long and 75 feet wide will connect the hangars with an east and west taxiway. The first 200 feet of the latter, on the east end, will be of concrete and the remaining 1,250 feet will be asphalt.

A total of 15,000 square yards of concrete was laid in the aprons and taxiways. The aprons are of 7-5-7-inch section. The concrete has a water-cement ratio of 5.5 gallons per sack and 5½ sacks of cement per cubic yard.

The concrete batching outfit included a P & H 600 gasoline crane equipped with a 1-yard clamshell bucket, a 200-ton bin and a weighing batcher. The concrete was laid by a Koehring 27-E paver followed by a Lakewood finishing machine.

In addition to equipment already mentioned there were: one subgrader; a motor patrol used in smoothing the shoulders of the runways, taxiways and aprons; a P & H 600 crane at the asphalt plant, similar to the one used at the batching plant; and 13 GMC, Chevrolet, Ford and Diamond-T trucks.

Personnel

Plans for construction of Oklahoma City Municipal Airport No. 2 were prepared under the direction of Lt.-Col. H. A. Montgomery, District Engineer, U. S. Engineer Office, Tulsa, Okla. Dahlgren & Brooks, Oklahoma City, Okla., was awarded the contract for the runways, taxiways and apron construction. E. W. Dahlgren and Bert Brooks make up this partnership, with Wayne Brooks and E. T. Bowen Superintendents for the contractor on this job. In addition to the superintendents, the contractor employed an average of 6 foremen and 30 skilled laborers. Unskilled labor was furnished by the city but all labor, skilled and unskilled, was under direct supervision and control by the contractor.

Among the helpful booklets published by the Metropolitan Life Insurance Co., New York City, are a 32-page study of silicosis and the booklet "Health Protection in Welding". They are available gratis to our readers.

BALANCED WHEELBARROWS... EASY-WHEELING and TOP QUALITY ...for over 38 YEARS!

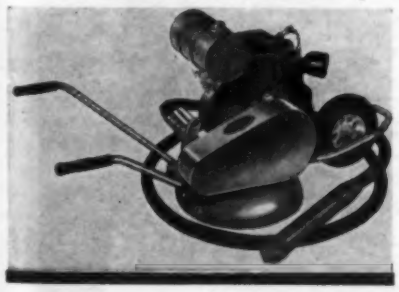
● When STERLING started in 1904, contractors and engineers were assured, for the first time, of standards of QUALITY equal to the toughest demands of the construction industry. TODAY, with over 38 years' experience and improvements in design, materials and construction, STERLING QUALITY STANDARDS have advanced to meet the strenuous war time demands of the construction industry.

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

Look for this Mark of STERLING Quality

Sterling S WHEELBARROWS

MARVEL

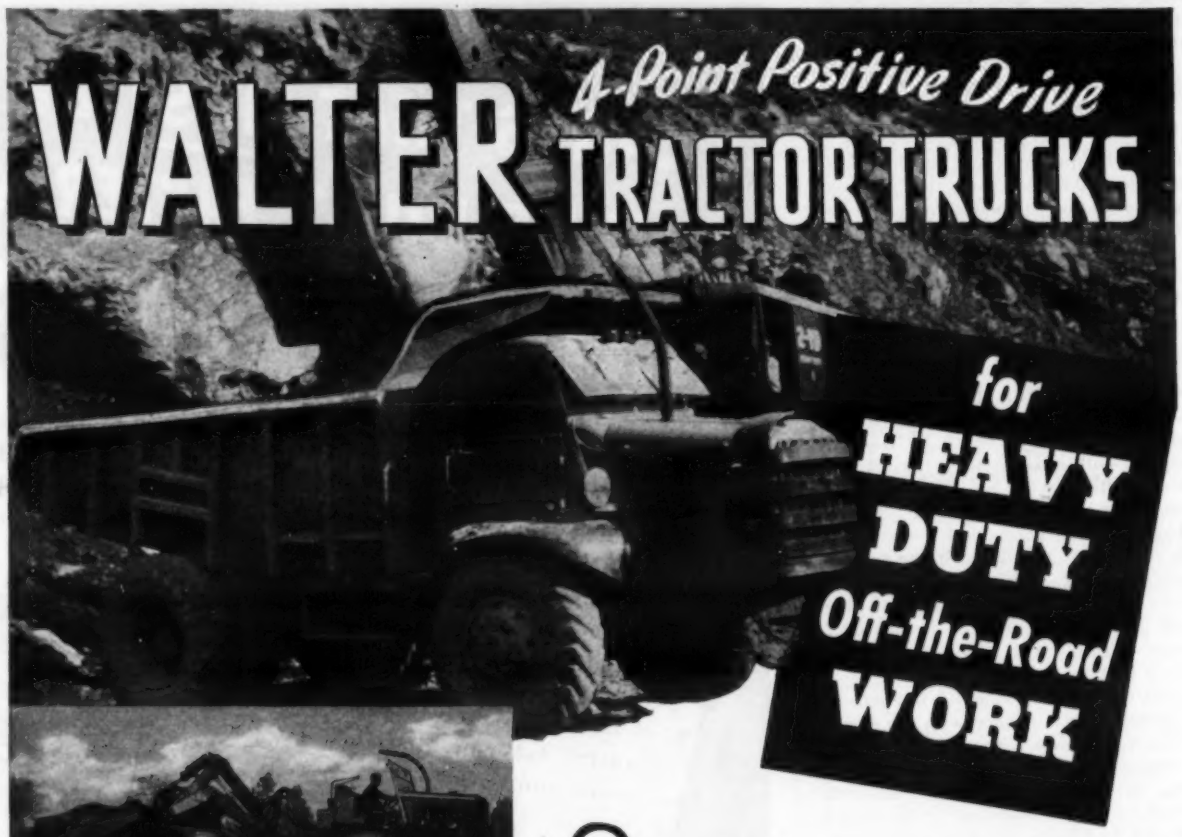


Demand These Features in Your VIBRATOR!

- ★ Gasoline or electric motor!
- ★ Can be wheeled to any part of the job!
- ★ Fool-proof clutch!
- ★ Positive power step-up!
- ★ Easily converted for grinding, drilling, brushing, etc.!

WRITE FOR LITERATURE AND PRICES

Marvel Equipment Manufacturers, Inc.
224 So. Michigan Ave. Chicago, Ill



Only a truck with the special engineering of Walter 4-Point Positive Drive can give you the extra power and traction needed to pull through soft dirt, mud, ruts and other difficult running conditions met in off-the-road hauling.

Walter 4-Point Positive Drive provides positive driving action in all four wheels. Patented Lock Differentials automatically proportion the torque to each wheel according to its traction, maintaining unfailing driving power to keep immense loads moving over soft or slippery terrain and up stiffest grades. Suspended Double Reduction Drive provides ample gear capacity and higher ground clearance for rough going. Tractor-type transmission permits proper gear ratios for all operating needs.

Walter Tractor Trucks are chalking up remarkable records in road building and maintenance, construction, logging, coal stripping, iron mining, power, communications and other off-the-road work. If you have any similar punishing jobs, learn how Walter Tractor Trucks can lick them. Write for detailed literature.

WALTER MOTOR TRUCK CO.
1001-19 IRVING AVENUE, RIDGEWOOD, QUEENS, L. I., N. Y.

Long Pipe Line Laid To Serve East Coast

(*Continued from page 1*)

homa Contracting Co., of Dallas, and from the Alabama line to Greensboro, Williams Bros. of Tulsa, Okla. The latter concern also has the contract for lateral lines in Georgia and Tennessee.

This large-capacity line will carry kerosene, heating oil and tractor fuels as well as gasoline, and will employ 14 pumping stations to carry the liquid along at a standard speed of 3 miles per hour. The number of pumping stations may be augmented if desired, thus increasing the capacity.

Permit for the line was issued direct by President Roosevelt under a pipe line act granting private corporations the right of eminent domain under certain conditions. This was done over the protests of railroads in order to establish an "interior line of supply" of a defense essential, thus eliminating some of the long tanker hauls around Florida which have been described by Secretary of War Frank Knox as a "vulnerable point in our national defense."

Work on Alabama Section

The technique followed by the Oklahoma Contracting Co. on the 210-mile Alabama section of the line may be considered as typical of that used by other contractors. This concern employed two separate gangs to speed the work.

After the 30-foot right-of-way had been secured, the contractor started a clearing gang whose duties consisted of cutting and removing all trees and underbrush. After this, the grading gang blasted the stumps that were left in the ditch line and, by means of tractors equipped with bulldozers, graded a sufficient width for the movement of machinery for the gangs to follow.

The stringing gang hauled the 12¾-inch steel pipe and placed it end to end, leaving an extra joint of pipe at intervals to take care of any shortage of pipe which might be caused by laying over uneven terrain. The pipe was in 40 to 45-foot lengths.

Next the ditching machine opened up the trench in accordance with the specifications. In places where rock was encountered and the machines were unable to dig, the blasting crew drilled the rock and blasted with a charge of dynamite sufficient to loosen the rock. The loose rock was then removed from the ditch either by the machine or by hand labor.

The laying gang picked up the pipe with tractors equipped with side booms and winches and placed it over the ditch, electric-welding it together with a stringer bead. In cases where rough terrain was encountered, it was necessary to bend the pipe to make it fit the ditch. When the line changed its direction, it was necessary to put a side bend in the pipe. Before the pipe was lowered into the ditch, it was tested for leaks or for defects with air pressure.

Contraction and expansion were taken care of by laying the required slack, leaving slack loops suspended on skids at intervals and lowering the loops into the ditch early in the morning when the temperature was at its lowest point. The welding crew then completed the welds, followed by the lowering and backfilling crew. Where the soil was found to be corrosive, the pipe was coated with hot enamel.

After the line was completely covered, the clean-up crew repaired all fences, opened all natural drains that had been obstructed and removed any tools, materials or rubbish that had been left on the right-of-way.

On all navigable streams the line was laid across according to the Government's specifications, the pipe being placed approximately 3 feet below the bed of the stream.

With a tractor for an anchor, this Link-Belt trench hoe excavated the pipe trench along a creek bank.

Equipment Used

Machines used by the Oklahoma Contracting Co. included Lincoln 200-ampere arc welding equipment; Caterpillar and International tractors, some with side booms and some with bulldozers; two Buckeye 12 ditchers and three Cleveland Model 140-A ditchers; two Cleveland No. 90 backfillers; an International T-20 equipped with a Bucyrus-Erie blade for dressing up of the backfill; several Link-Belt Speeders, equipped with hoe and dragline attachments for use on river and creek crossings; and Ford and White trucks.

Paul R. Halbert was Superintendent on the job for Oklahoma Contracting Co., with C. R. Ice, P. A. Thurman and Mike DeLuca as Foremen.

Do your share in the fight for freedom. Buy U. S. Savings Bonds and Stamps for Victory.

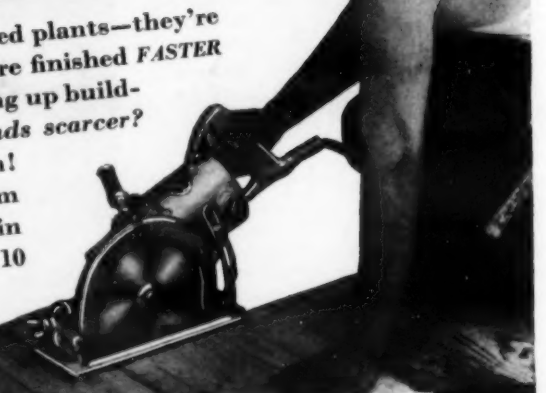
NEW H-S PORTABLE ABRASIVE CORE DRILL

For heavy drilling of reinforced concrete—taking test cores in concrete highway construction and floor slabs. Drills holes 3½" to 4¼" dia. Smaller models down to ½" diameter. Gasoline or electric power. Write for descriptive circular.

HOWE-SIMPSON, Inc.
50 E. Broad St.
COLUMBUS, OHIO

PLANTS THAT MUST BE BUILT FAST CAN BE BUILT *FASTER* with SKILSAW TOOLS!

NEW plants, enlarged plants, remodeled plants—they're needed *FAST* for America's victory . . . they're finished *FASTER* when SKILSAW TOOLS are on the job, speeding up building each hour of each day. *Are skilled hands scarcer?* One hand with SKILSAW does the work of ten! *Is time too short?* SKILSAWS cut days from schedules . . . SKILSAW DRILLS punch holes in bottlenecks! *Do you want proof?* 9 out of 10 defense contractors use SKILSAW TOOLS! Ask your distributor for a demonstration.



SKILSAW trims roof sheathing faster . . . after it is nailed in place to save extra time.

SKILSAW quickly cuts plywood panels . . . speeds up concrete form work . . . makes pocket cuts swiftly.

SKILSAW DRILL speeds up timber boring. Powerful, yet compact for drilling in close quarters.

SKILSAWS speed up *all* sawing in maintenance, remodeling and construction. Cut out old flooring . . . make pocket cuts in walls and floors for service pipes and ducts. Size and trim all lumber . . . cross-cut, bevel-cut, rip and groove. 9 Powerful Models.

SKILSAW DRILLS are as fast on maintenance and remodeling work as they are on production! Do all drilling from lightest lead holes for hardware and fixtures to heaviest boring in construction. Swiftly drill holes for all conduit and pipes. 22 Powerful Models.

SKILSAW, INC., 4769 Winnemac Ave., Chicago

New York • Boston • Buffalo • Philadelphia • Cleveland • Detroit • Indianapolis • St. Louis
Kansas City • Atlanta • New Orleans • Dallas • Los Angeles • Oakland • Seattle • Toronto, Canada

SKILSAW PORTABLE ELECTRIC TOOLS

★ FOR THE DEFENSE OF AMERICA ★

Salvage Meets Need For New Equipment In Nebraska County

The problem faced by many counties, state highway departments and contractors today is their inability to secure a machine for a particular and urgent job. Priorities demand that machines be delivered first to the armed forces and second to those who are building for them. Where a job is distinctly civilian in character, even though it may be on our highway system, the priority rating is so low that a machine frequently can not be secured at the time of the emergency when it is most needed.

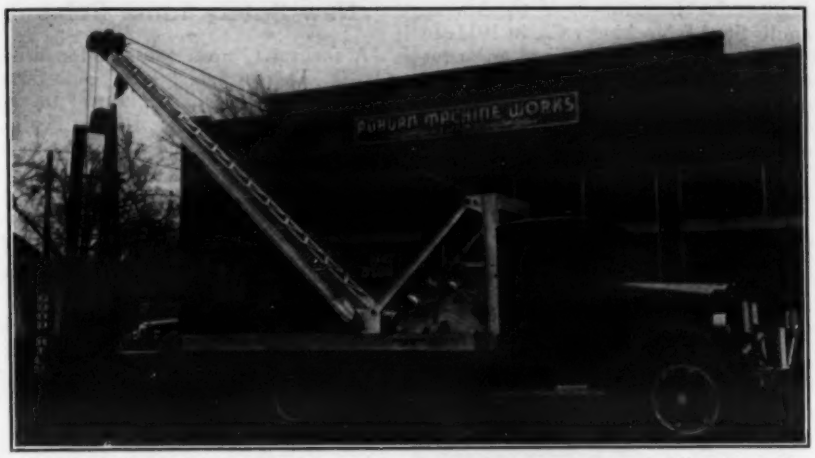
The Road Commission of Nemaha County, Nebraska, found it impossible to get delivery on a combination pile driver and hoist needed for salvaging bridges washed out in a spring flood on the Nemaha River. They sought the help of F. J. Schmidt, a machine shop owner of Auburn, Nebraska. Mr. Schmidt, with his three employes, built the entire outfit in their small shop by arc welding, securing the necessary steel from junk yards or by salvage. The machine thus created cost $5,000 less than the estimates for a new machine, but at the particular time its actual value was many times that of the new machine which the county could not purchase, so that the monetary saving was not as important as the acquisition of badly-needed equipment.

The parts for the pile driver and hoist came from varied and amusing places. The main boom was a leg from an old Nebraska City water tower; the floor deck of solid steel came from a salvaged cemetery bridge; the ladder on the 2,000-pound hammer leads was taken from an old Peru, Nebr., water tower; and the power take-off was built from used tractor parts and standard gleaner-combine sprockets and chain. The hoist was driven from the power take-off by a four-line chain and sprocket combination.

A particularly interesting feature on this driver is a small hand-operated worm gear hoisting drum which is used to raise and lower the leads as needed for the travel of the heavy hammer without changing the position of the boom. The hoist, a 2-drum Sterling, is equipped with over 600 feet of cable.

The truck for the outfit is a 6-cylinder Diamond-T. the motor of which furnishes power for the hoist which can be operated in four different speeds, controlled by the regular truck transmission. The driver head with the hammer is folded up under the 25-foot boom for transportation. A folding stiffleg was built on the rear of the truck to relieve the strain on the springs while the pile driver is in operation.

This useful machine was produced in a small local machine shop by arc welding alone. Welding salvaged the parts, cut them to shape, and joined them together in a lightweight but heavy-duty unit. We are indebted to Hobart Brothers Co., Troy, Ohio, manufacturer of the welding equipment, for this information.



A hoist and pile driver built from salvaged steel by means of arc welding to meet an emergency need for repairs to washed-out bridges in Nemaha County, Nebraska.

New Booklet Describes Shovel-Dragline-Crane

The Link-Belt Speeder LS-60 heavy-duty ½-yard crawler shovel-dragline-crane is described and illustrated in a new 8-page booklet recently issued by the Link-Belt Speeder Corp., 301 W. Pershing Road, Chicago, Ill. The features of simplicity, reserve power, easy handling and all-welded construction are discussed, and working ranges, lifting capacities, clearance dimensions and other pertinent data are given for shovel, dragline, crane, clamshell and trench-hoe operation.

Copies of this new book No. 1929 may be secured by those interested direct from the manufacturer.

MADSEN *Twin-shaft* PUG MILL MIXERS

The most important equipment embodied in an asphalt plant is the Mixer. No other part of the plant suffers the hour-after-hour grinding punishment which this unit must withstand. The Madsen Pug Mill Mixer built for production of asphaltic-bound mixtures assures you dependability, economy and outstanding production.

A faster mix and a faster discharge—ease of replacement and simplicity of construction—all are features of the Madsen Pug Mill Mixer.

MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA

Now more than ever you need BAKER Hydraulic Bulldozers

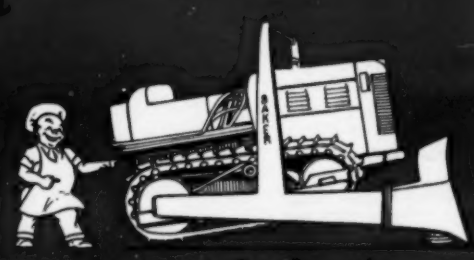
★ Greater Output — direct down pressure, easier control, greater moldboard area gives bigger yardages every shift.

★ Easier Maintenance—they'll do more with less wear and tear on the tractor, the hydraulic power unit and the bulldozer; conserving manpower and vital replacement parts, aiding greatly in defense.

★ More Flexible—three different moldboards fit one frame; can be changed in a few minutes —straight board for "cut and fill"; curved, boxed-end board for excavators; angle board (to left or right) for gradebuilding.

★ Complete Line — 7 bulldozer models with corresponding gradebuilder and excavator moldboards for gasoline and diesel tractors of any horsepower. See them at work on every type of construction project in Bulletin 834.

The Baker Mfg. Co.
125 Stanford Ave., Springfield, Illinois



BAKER
The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING

Drainage, Cushion Course on Wis. Road

(*Continued from page* 23)

job. One, which ran from 2½ to 5 feet in depth, was cleaned out with one of the Carryall scrapers and then backfilled with borrow dirt. The other marsh area was about 1 mile west of Gilman and ran about 13 feet deep. It was excavated with a Northwest ¾-yard dragline and then backfilled with borrow dirt. The same dragline was used for making a small channel change at the bridge site.

Drainage

All of the culverts were either salvaged corrugated culvert pipe or new Republic Steel Corp. U-Loy corrugated metal. The specifications required that all culvert pipe be rolled into place and not dragged, as this might break the spelter coating. Most of the culvert trench excavation was done by hand, although a small amount was done by the dragline. All of the culverts across the road were laid in two or three sections, with one-section culverts for the driveways.

Sand-Gravel Cushion Course

The contractor located three gravel pits satisfactory to the State along the job at distances varying from ¼ to ¾ mile off the road. There was one at each end and one near the middle of the job. A Lima ¾-yard shovel was used in the pits for loading the sand-gravel borrow into hired trucks which dumped on the road, and then the TD-40 and bulldozer spread the material to a uniform depth of 18 inches along the center of the road and feathered at the edges.

Quantities

The major quantities on this $57,586.55 contract included:

Clearing	4.65	acres
Clearing trees	227	in.-diam.
Grubbing	6.55	acres
Grubbing trees	263	in.-diam.
Common excavation	64,020	cu. yds.
Marsh excavation	2,543	cu. yds.
Structure excavation, for bridge	10	cu. yds.
Sand-gravel fill	79,603	cu. yds.
Borrow, for fill	23,320	cu. yds.
Corrugated galvanized-iron culvert pipe, 18-inch	48	ft.
Corrugated galvanized-iron culvert pipe, 24-inch	544	ft.
Corrugated galvanized-iron culvert pipe, 30-inch	880	ft.
Corrugated galvanized-iron culvert pipe, 36-inch	80	ft.
Corrugated galvanized-iron culvert pipe, 60-inch	296	ft.
Corrugated culvert pipe, salvaged and reused, 18-inch	314	ft.
Corrugated culvert pipe, salvaged and reused, 30-inch	198	ft.
Corrugated culvert pipe, salvaged and reused, 36-inch	39	ft.
Treated timber piling	900	ft.
Treated timber piling, driven	630	ft.
Bridge timber	4.61	MBM
Riprap at culverts	220.8	cu. yds.
Seeding	162,720	sq. yds.
Sand-gravel fill for cushion	79,603	cu. yds.
Finishing roadway (includes blading and hand work on slopes and ditches)	297.8	stations
Concrete masonry, bridge floor	32.4	cu. yds.
Bar steel reinforcing, bridge	6,660	lbs.
Structural steel, bridge	21,730	lbs.
Zinc plate	57	lbs.

Personnel

The contract for grading and drainage on 5.649 miles of Wisconsin Highway 64, running west from Gilman to the Chippewa County line, was awarded to L. G. Arnold, Inc., of Eau Claire, Wis. The contract was designated as FAS 128-A (2). C. A. Lowe was Superintendent for the contractor, and A. L. Kotz was Resident Engineer for the Wisconsin State Highway Commission.

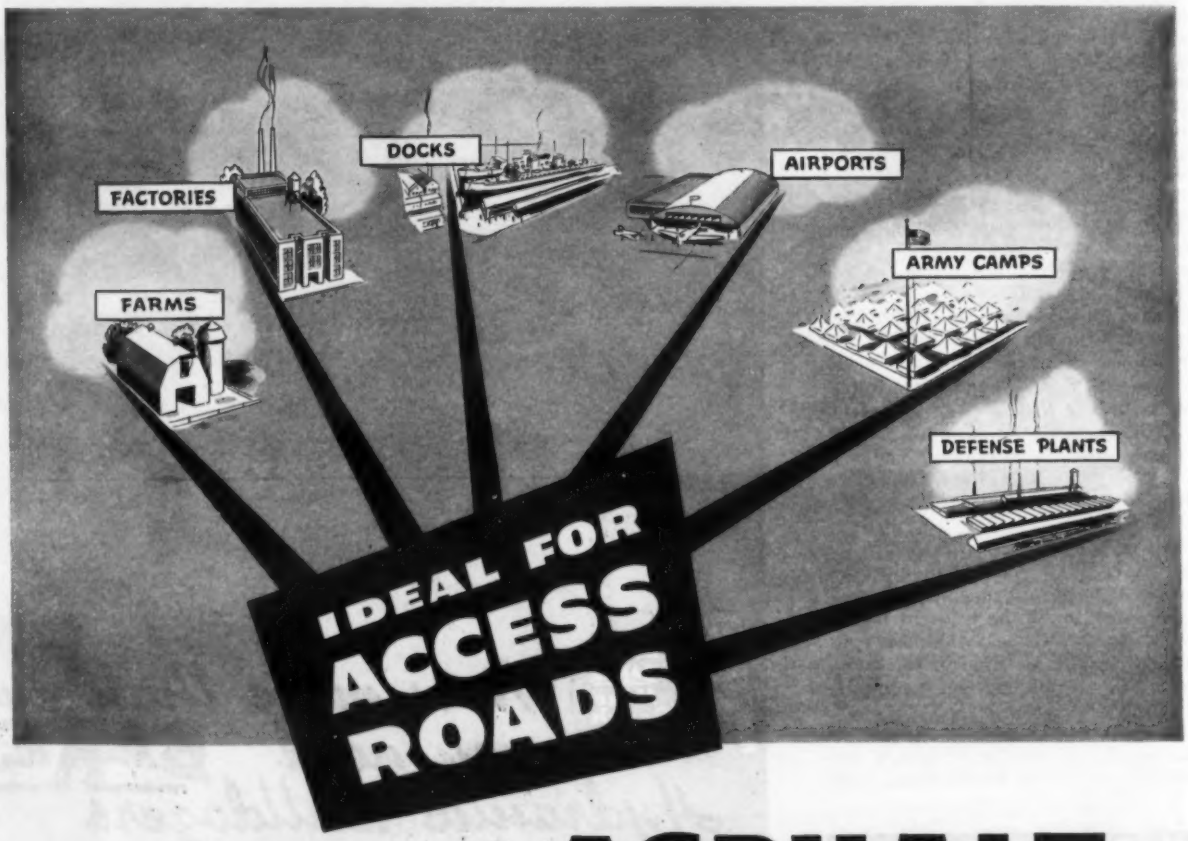
Industrial Sales Manager, Minneapolis-Moline, Dies

S. O. Hall, Industrial and Mechanical Sales Manager of Minneapolis-Moline Power Implement Co., Minneapolis, Minn., for the past 15 years, passed away suddenly on February 25, 1942. Born in Seattle, Wash., on October 24, 1888, Mr. Hall entered the Mechanical Engineering Department of the Minneapolis Steel & Machinery Co. in 1911. In 1916 he became a mechanical estimator and salesman and in 1926, Industrial and Mechanical Sales Manager, assuming this same position with the Minneapolis-Moline Power Implement Co.

New Safety Inner Soles

A new safety inner sole developed by Goodall Rubber Co., Inc., 2 South 36th St., Philadelphia, Pa., is aimed to reduce compensation rates by practically eliminating foot injuries due to nail punctures. This safety inner sole has a flexible steel sheet between two layers of high-grade leather. These "laugh at nails" inner soles are sold in sizes to fit all boots and shoes.

Prices and further data may be secured direct from Goodall Rubber Co.



STANDARD OIL **ASPHALT**

● Highway traffic is the blood stream of the victory production program. Miles of improved, widened, and new highways, are needed to link together the food and material production centers, defense plants, army camps, and airports. Asphalt construction provides a means of supplying these vital arteries of industry now, when they are needed, because:

• **Asphalt** requires the minimum amount of time between the start of the paving job and the final load-carrying finish.

• **Asphalt** roadways can frequently be built with local aggregate. A big saving in transportation time and expense.

• **Asphalt** construction requires only equipment that is readily available.

• **Asphalt** surfaces can be quickly restored to service when damaged, even if by enemy bombs!

Wherever Standard Oil Asphalt products are sold, there is a Standard Asphalt Representative who can give you full information about its application to your problem. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest you.

OIL IS AMMUNITION — USE IT WISELY

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Asphalt for every purpose STANDARD OIL COMPANY (INDIANA)

Lining a section of the Contra Costa Canal in California. Completed sections of this canal, a part of the Bureau of Reclamation's Central Valley Project, are carrying water to west-coast plants producing war materials.

Irrigation Project Now Aids War Effort

The Government's vast Central Valley Project in California, authorized in 1937 primarily to preserve the rich agricultural development in a large section of California, will be put to work to serve the war production program. Already completed sections of the Contra Costa Canal system are carrying essential industrial water to west coast steel and chemical plants which are operating full blast on war materials. Electrical energy generation for airplane and war production will start late next year from Shasta Dam, keystone of the project, where construction schedules have been stepped up by many months. The same situation prevails at Keswick Dam.

The construction of Shasta Dam, the world's second largest concrete dam, is 65 per cent complete, and Friant Dam, also a part of the project and the world's fourth largest dam, is 93 per cent complete, according to a recent report by Commissioner of Reclamation John C. Page, based on a year-end review of project activities forwarded from Sacramento by District Engineer R. S. Calland.

Estimated to cost $263,990,000, the project has had $110,950,000 in Federal funds made available to date, of which about $90,000,000 has been spent for labor, materials, equipment, rights-of-way, and water rights. District Engineer Calland reported that CVP expenditures are now running about $3,000,000 a month, or $69 a minute. More than 28,500,000 man-hours of labor has already been used on the project, with present employment a little more than 5,000 persons. The 1941 payroll was approximately $11,725,000.

Every section of the United States is participating directly in the construction of the project, with a total of 40 states having furnished more than $30,000,000 worth of supplies used so far by the Bureau of Reclamation and its various contractors.

Survey and Map Meeting

The Proceedings of the First Annual Conference on Surveying and Mapping conducted by the School of Engineering, Department of Civil Engineering, at the Agricultural and Mechanical College of Texas, College Station, Texas, has been published as Bulletin 56 of the Engineering Experiment Station, and copies may be secured direct from the college.

The papers included cover the duties and responsibilities of a general land office, the needs for a plane coordinate system in Texas and its value, some judicial decisions affecting property lines, retracing Texas land lines, city mapping, land subdivision for city purposes, and a modern mapping program.

Airport Dollar Volume Passing Highway Figure

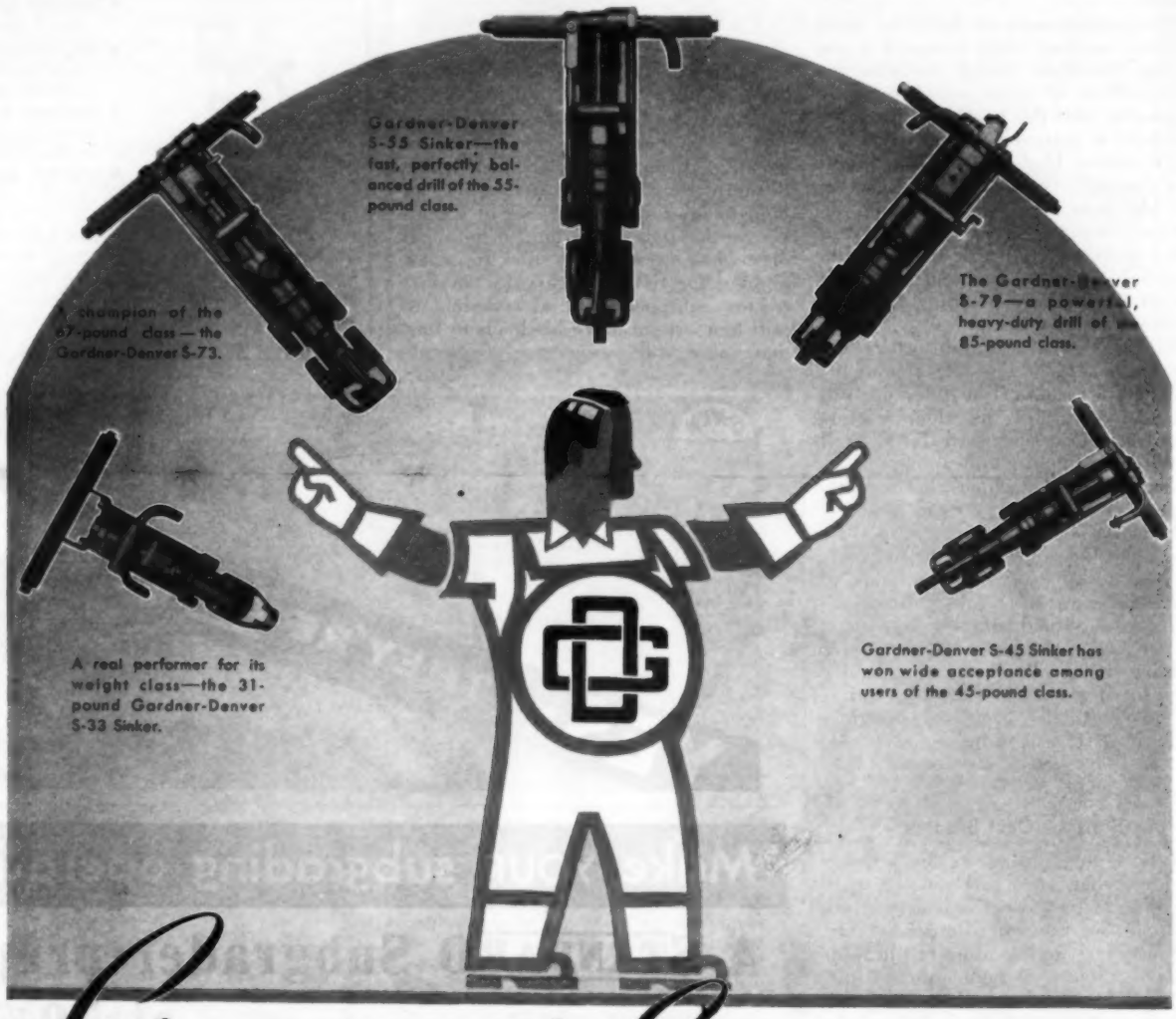
According to reports presented at the AGC convention, it is expected that during 1942 the airport construction program will far outstrip the dollar value of the highway program. Within the next six months the Civil Aeronautics Authority will let $94,000,000 in contracts for construction on municipal airports and in addition $600,000,000 will be expended by the U. S. Army on 14 airports within the borders of the United States and 11 outside.

The grading and paving at these Army airport projects will total about $150,000,000 and, in addition, it is estimated that Navy airport construction will total $25,000,000. Another $5,000,000 is already appropriated for Flight Strips adjacent to highways, practically all of which will be grading operations.

CUMMER
ASPHALT
PLANTS

Portable Combination Hot and Cold Mix Plants
Portable Hot Mix Plants
Stationary Combination Hot and Cold Mix Plants
Cummer Combination Dryer-Coolers.
Steam Jacketed Mixers 400 to 8000 pounds capacity.
Cummer Internal Fire Dryers
Electric Batch Timers

THE F. D. CUMMER & SON CO.
Euclid and 17th, Cleveland, Ohio


Gardner-Denver S-55 Sinker—the fast, perfectly balanced drill of the 55-pound class.
A champion of the 67-pound class—the Gardner-Denver S-73.
The Gardner-Denver S-79—a powerful, heavy-duty drill of the 85-pound class.
A real performer for its weight class—the 31-pound Gardner-Denver S-33 Sinker.
Gardner-Denver S-45 Sinker has won wide acceptance among users of the 45-pound class.

Choose from the Champions

• • • FOR THE EXTRA FOOTAGE YOU NEED TODAY

● For increased output—and for the extra footage required during 1942—choose the sinkers that give *extra* performance. You'll find a better sinker of every weight class in the Gardner-Denver complete line. Properly engineered, precision-built Gardner-Denver Sinking Drills for every purpose embody the proved refinements you want—and the speed, the power and dependability you must have. For specifications, write Gardner-Denver Company, Quincy, Ill.

GARDNER-DENVER PRODUCTS KEEP SPEED IN VICTORY

GARDNER-DENVER *Since 1859*

Scraper Cost Study At Ordnance Plant

(*Continued from page 7*)

wanted to get the building site down to grade so that carpenters, steel crews and concrete workers could start the foundations. Because the material was stable and would stand up vertically, many of the cuts were planned with slopes as steep as ¼ foot horizontal to 1 foot vertical.

As soon as the cuts were opened up and dug about 2 feet deep, it was found that certain of the machines were especially suited to some of the problems. For example, the operators were having a batch of trouble cutting the side slopes at the steep angle specified in order to get down to the foundation with room to spare. An Allis-Chalmers HD-10 diesel tractor with a Baker bulldozer was brought out to gouge the sides of the cut to grade where false points protruded.

This practice went on for a few shifts until the walking shift boss and a few of the operators found out that the Bucyrus-Erie scrapers were especially adapted to meet this particular problem. The S-90 is designed so that the 8-foot 3-inch cutting blade reaches out almost to a line with the rear wheels, making possible vertical cuts and loading up against extremely steep banks. After that discovery was made, the four Bucyrus-Erie scrapers were sent in to load against the bank when loading there was necessary.

On the rest of the job, where the scrapers stayed in line one behind the other, not a great deal of difference was noticed. A few of the older tractors with track grousers worn fairly well would not load quite as heaping a measure as the newer machines, but for purposes of performance they can be classified equally.

Grading the ordnance plant site eventually resolved itself into a number of individual excavating jobs. When the project was visited, digging was about 60 per cent complete. Clay from a building site on a knoll was being hauled down to a low corner of the reservation. On this particular cycle of operations about 7½ feet had to be removed from an area 1,000 feet long and several hundred feet wide.

Scraper Cost Studies

A time study made on the scrapers disclosed that, on a full round trip of 2,565 feet, they were doing a good, cheap job of removing the sticky clay. The machines were loading full heaping loads in 300 feet, averaging about 2 minutes in the loading operation. This was done in first gear. Even in taking off a thin 3-inch layer, it was necessary to "waggle" the tractors by steering first one crawler tread and then the other to get enough traction to heap the load.

Once loaded, a tractor traveled 1,160 feet out to the dump area, operating in fourth gear, and going back to third only when necessary in spongy or soft material along the road. Soggy places were patched by dumping a load or two of material over them.

After digging so much wet clay and dumping it in a low place, one can well imagine how soft and mushy the dump area became. Some consolidation of the clay resulted from the weight of the tractors passing over it, but for the most part the dump was a soggy mass to be treated with a lot of respect unless a tractor was to be stuck most of the time. Dumping was usually done therefore in third gear, using fourth gear only if the dump was as solid as the haul road.

The return trip to the loading site measured some 1,000 feet. This distance, with an empty scraper, was a breeze for the tractors in fifth gear. The field performance of the machines grouped together during the loading, hauling, dumping and return parts of the cycle are all included in this summary, covering the loading and hauling of heavy wet clay, with a maximum grade of 7 per cent and a round trip totaling 2,565 feet.

DIRECT COST BREAKDOWN: (Per Machine)

1 tractor operator, 8 hours	@	$1.50 —	$12.00
20 gallons diesel fuel	@	.06 —	1.20
2 quarts lubricating oil	@	.25 —	.50
2 pounds grease	@	.10 —	.20
8 hours maintenance and repair	@	.50 —	4.00
8 hrs. item incidentals	@	.60 —	4.80
Total field operating expense per shift		—	22.70
Total field operating expense per hour		—	2.83

COST OF EXCAVATION:

If Machine Moves	It Makes	Cost Per Yard
16 cu. yds. per hour	2 trips	$0.177
24 "	3 trips	.118
32 "	4 trips	.089
40 "	5 trips	.071
48 "	6 trips	.059
56 "	7 trips	.051
64 "	8 trips	.044
72 "	9 trips	.039

Preventing Delays

At the time the study was made, the scrapers were hauling 1,160 feet, which is within 40 feet of the limit where scrapers are generally conceded to be effective. Even so, the machines at that distance were making five trips per hour to show a field dirt cost of 7 cents per yard. It is interesting to note that once when a tractor was stuck for a few minutes the time necessary for another tractor equipped with a snakeline to pull him out cut down his loads to four that hour, with an increase of 2 cents per yard.

What about complete breakdowns? It can well be imagined what happens to the cost-production volume ratio when a scraper breaks down. Costs go on but production stops. There is only one major reason for scraper idleness on the larger scrapers. It is always caused by the wear and breakage of the control cables. More time is lost replacing cable and sheaves whose grooves are chewed up by worn, frayed, porcupined ends and crown wires than by any other

(*Concluded on next page*)

"TOOLS OF WAR COME FIRST!!"

Any other use of steel presents a challenge to every producer, designer, and user.

IN CONSTRUCTION ALONE, many THOUSANDS OF TONS of steel can be converted to vital armament through ADVANCED DESIGN and CONSTRUCTION ECONOMY to eliminate waste.

This is one of a series of recommendations for WEIGHT SAVING DESIGN to conserve wartime steel and production.

WHEN ORDERING REINFORCING STEEL:

- SPECIFY AVAILABLE GRADES.
  Permit optional use of rail steel or billet steel.
- REQUIRE STANDARD SIZES
  Sizes other than those of Concrete Reinforcing Steel Institute designation will cause delay.
- DEMAND PLACING PLANS AND BARLISTS
  Competent engineering service helps the mill to speed your job.
- SPECIFY BARS CUT TO LENGTH
  Stock length shipment wastes vital tonnage and time in the field.
- DEMAND SHOP FABRICATION
  Shop bending is accurate, minimizes breakage and waste, and saves many critical man-hours on the job.

LACLEDE STEEL COMPANY
ST. LOUIS MISSOURI

Design Series No. 2

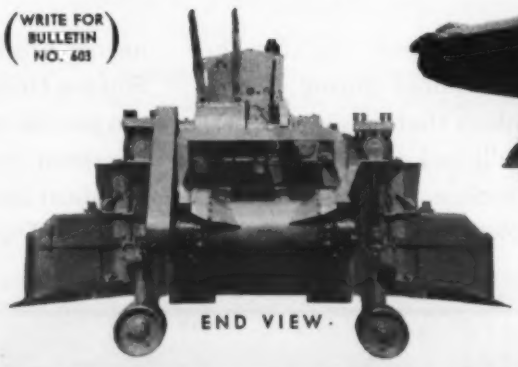
Make YOUR subgrading operations *pay a profit:*

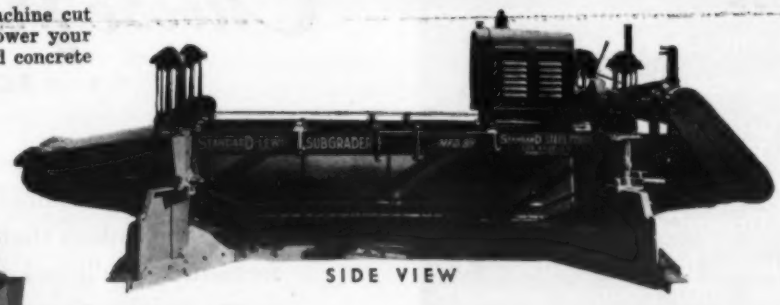
A STANDARD Subgrader prepares subgrade at 50% to 90% saving!

One operator and a helper can prepare subgrade with this machine at the lowest cost ever attained.

Not only does the efficiency of this machine cut down subgrading costs, but it will also lower your costs of rough grading, form setting, and concrete or asphalt placing.

(WRITE FOR BULLETIN NO. 603)





SIDE VIEW

And dollar losses due to voids and improper subgrade will be entirely eliminated.

This machine is building most of the airports in the West.

Detailed records to substantiate this claim are obtainable from contractors using these subgraders. *Write us for further information.*

STANDARD STEEL CORPORATION 5001 So. Boyle Los Angeles

JAW CRUSHERS, FOR SALE

3—10 x 16 Eagle portable crushing plants complete with 20' elevators, Case power units, V-belt drive. Practically new. $2,100 each.

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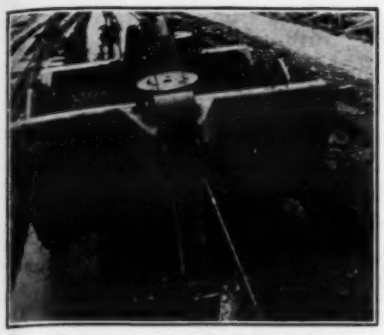


A full scraper load in very wet clay at the site of an ordnance plant in the midwest.

Ordnance Plant Job Run at Top Speed

(*Continued from preceding page*)

regular item of repair. Manager Stowell whipped that problem on this job by installing preformed control cables on all but the Gar Wood hydraulically controlled scrapers. Many of the scrapers used reverse bends in the rigging layout, doubling bending fatigue. The use of the improved type of rope resulted in a 40 per cent increase in service life because it resisted bending fatigue to approximately that extent. Furthermore, it increased the life of sheaves 300 per cent because the crown wires, even when they were badly worn, would not stand up to cut the sheave grooves to pieces. Since the job was a very important part of our defense program, Stowell's choice was a wise one.

His fleet of scrapers moved about 3,000 cubic yards per shift. Operations were carried forward on a 24-hour basis, handling about 12,000 cubic yards per day with all machines. That represents 9,000 scraper-yards.

Other Excavation and Concrete

Additional structure excavation for drain lines and recessed parts of the buildings was handled by a Bucyrus-Erie 33B crane equipped with a 1¼-yard Haiss clamshell. In some parts of the building excavation the removal of 10 feet or more of earth had exposed the hard, shaly native fire clay which was loaded out by the clamshell into a few of the 5-yard Fords.

The whole excavation program was planned to complete the excavation for one building before any other work was started. It worked successfully. Irregular areas of uncompleted digging between buildings were picked up later and loaded out by a Northwest 1½-yard shovel.

Fine grading was done by a Caterpillar No. 12 diesel patrol and an Austin-Western 99 motor grader. When the fine grading had been completed, the steel crews went to work with the carpenters, getting things ready for concrete. The majority of the buildings are reinforced concrete throughout, designed along simple lines to facilitate their rapid erection.

Rex Moto-Mixers were used to mix and transport the concrete. Bundles of steel reinforcing were hoisted to wall and superstructure pour locations by the Bucyrus-Erie 33B crane. This machine was also used with a 1-yard concrete bucket to pour the high parts of the buildings. Mall vibrators were used in consolidating the concrete. An excellent grade of Class A concrete with a 2-inch slump was used in all of the buildings for this ordnance plant.

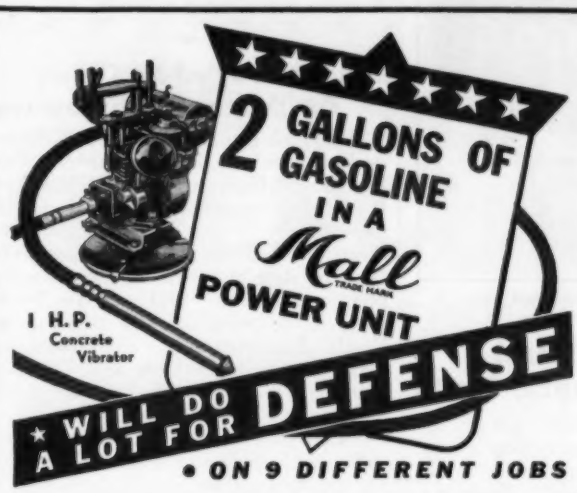
Manager Stowell conducted all of the work under the immediate supervision of the U. S. Constructing Quartermaster, with field direction by Major David L. Van Syckle.

New Surveying Book

A new short textbook covering the fundamentals of surveying has recently been prepared by Charles B. Breed, Professor of Civil Engineering, Massachusetts Institute of Technology, and published by John Wiley & Sons, Inc. Because of the broadening of the field of civil engineering to include the newly developed branches of the profession, there has been a tendency to curtail instruction in some of the older branches, and surveying has been particularly subject to abridgment. *Surveying* has been prepared to meet the demand for short texts which adequately cover the fundamentals in a limited time.

Since many short courses in surveying must place the emphasis on the principles and on the use of surveying instruments, this part of the text has been made quite complete, and many field exercises and problems have been included which, if carefully worked out, will give the student a sound fundamental knowledge of surveying technique. The usual field and office practices in land surveys, in leveling and in topographical surveys are thoroughly covered; the chapter on lines and grades is designed to give an insight into the surveying problems in connection with engineering construction; the text relating to public lands surveys contains the latest practices; and aerial surveying is covered to the extent necessary to identify when it should be employed and how its accuracy may be controlled by means of ground surveys.

Copies of the 495-page book *Surveying* may be secured by those interested from John Wiley & Sons, Inc., 440 Fourth Ave., New York City, or from this magazine. Price: $3.00.



We Make Over 200 Gasoline Engine Air and Electrically Operated Portable Power Tools and Attachments

With only 2 gallons of gasoline, you can get a full day's work from this one-man portable power unit . . . save time, material and do more for Defense with fewer hands. The 1 H. P. air-cooled, variable speed gasoline engine supplies ample power for *Concrete Vibrating, Concrete Surfacing, Sanding, Wire Brushing, Grinding, Sharpening Tools, Drilling, Circular Sawing, and Pumping.* It is easily carried anywhere on the job—is easy to start and runs by itself. Ruggedly constructed for field service under all conditions. Write for a FREE Demonstration and 1942 catalog.

MALL TOOL COMPANY
7743 SOUTH CHICAGO AVE. CHICAGO, ILL.
Offices and Distributors in Principal Cities

HOW $3.00 WORTH OF RODS WILL RECLAIM A $30.00 TRACK ROLLER *and make it last twice as long as a new one!*

IF YOU OPERATE any type of crawler tractor, here is a hard-facing application that will help solve your replacement problems and pay you big dividends as well.

Get a worn roller from the scrap pile, and rebuild it to size with one or two passes of 3/16" Coated Stoody Self-Hardening. You won't need more than $3.00 worth of rods and your welder should be able to finish the job in an hour and a half. Properly reclaimed, the roller will last *twice* as long as a new, unprotected roller!

Here is more good news: When the Stoody Self-Hardening deposit finally wears away, the hard-facing operation can be repeated a second and even a *third* time with the same results. Coated Stoody Self-Hardening is the easiest of all hard-facing rods to apply and is economically priced at only 50c per pound, f.o.b. Whittier, California. It is also available through all Stoody Distributors.

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WHITTIER • CALIFORNIA

Send for this free folder describing the accepted method of rebuilding and hard-facing track rollers, track rails, sprockets, and cleats. Gives rod sizes, amperages, and suggests welding fixtures.

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Gentlemen: Please send me a copy of your booklet "Procedures for Rebuilding and Hard-facing Tractor Parts.
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STOODY COMPANY *Hard Facing Alloys*

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MIXERS
BATCHERS
PUMPS
SAW RIGS
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GET FREE CATALOG

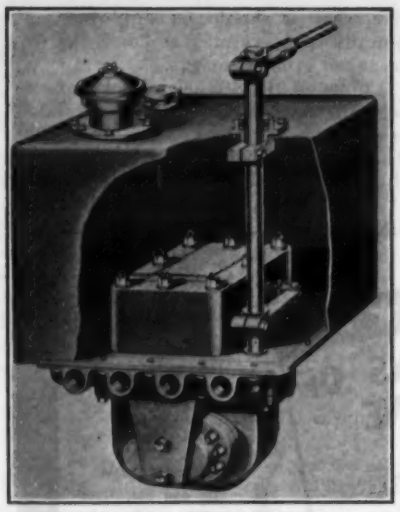
KOST KUTTER POWER SAWS

STREAMLINED! FAST CUTTING! STURDY!

CONTRACTOR SAYS: "There's no vibration. The engine floats on rubber and springs. I like its portability too."

Get information on CMC's 3 popular size power saws . . . Kost Kutter . . . Kost Kutter Jr. . . . and Heavy Duty Power Sawyer.

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA



The new Gar Wood control unit.

New Power Control For Hydraulic Units

A new hydraulic control unit for operating heavy-duty dirt-moving equipment used with track-type tractors has just been announced by the Road Machinery Division, Gar Wood Industries, Inc., Detroit, Mich. The manufacturer states that this Gar Wood hydraulic control unit converts mechanical power from the tractor motor to flexible hydraulic power for transmission to the hydraulic jacks on earth-moving scrapers, road-builders, bulldozers and rippers. The power for the unit is taken from the tractor motor through a direct-shaft connection to the pump, either from the transmission shaft of the tractor in the rear or from the motor crankshaft in front.

The integral construction of this new unit eliminates pipes, fittings and loss of oil; working parts in the pump and valve are made from high-grade alloy steel; and a large oil tank provides an ample oil supply and prevents loss from overheating. Ample oil passages throughout the valve, pump and lines reduce oil-flow resistance to a minimum, resulting in cooler operation and high efficiency, it is stated. Two magnets are placed in the suction line of the pump to catch and hold any metallic particles which might accidentally enter the oil supply. The controls are quick acting and only a slight effort is required to shift the control lever from one position to another.

It is reported that this new unit was tried and tested in the field for several years before being placed on the market, operating Gar Wood scrapers, bulldozers and rippers in the construction of highways, airports, ordnance and supply depots, and industrial defense plants throughout the United States, in Latin America and defense outposts.

Louisiana Filed No Claim For Damage to Highways

We are informed by Harry B. Henderlite, Chief Engineer, Louisiana Department of Highways, that no claim has been filed against the United States Government by the Louisiana Department of Highways for damages suffered by state highways during the military maneuvers of 1941. It has, however, in cooperation with the Public Roads Administration, undertaken to make surveys to evaluate any damages that may reasonably be attributed to the maneuvers.

Mr. Henderlite states, "Quite a bit of unfavorable publicity has been received by the Department, both through the Associated Press releases and, I believe, in several magazines of national distribution, concerning this alleged claim and any publicity which you may be able to furnish to clear the situation will be appreciated."

Soil-Cement Equipment

The increasing use of soil-cement construction on highways, airport runways, etc., has brought with it the demand for tools and equipment to handle this work. Allis-Chalmers Mfg. Co., Milwaukee, Wis., has recently developed a complete line of such tools, thoroughly tested in all types of soils, and has issued a 28-page catalog describing them.

Printed in two colors, the catalog illustrates and describes tractors, graders, disks, harrows, subgraders, mixers, water distributors, rollers and other equipment. Complete mechanical specifications are also provided.

This catalog, Form No. MS-802, is designed particularly to acquaint those inexperienced in this type of construction with the necessary equipment and may be obtained by writing direct to the manufacturer and mentioning this item.

Barrows for Defense Jobs

The American Steel Scraper Co., Sidney, Ohio, reports that it manufactures a streamlined 1942 barrow for every defense construction and maintenance job. The line includes a contractors' general purpose barrow, a No. 1 heavy-duty industrial barrow, a deluxe Pilot general-purpose barrow, a deluxe concrete barrow and a standard concrete barrow.

A catalog recently issued by this company describes and illustrates each model and gives complete specifications. Copies may be obtained by writing direct to the manufacturer and mentioning this item.

Model VE-4
22 hp., 4 cylinder, V-type Engine. Other types and sizes: 1 and 4 cylinder, 1 to 35 hp.

"Old enough to vote", in terms of continuous production and development, Wisconsin heavy-duty air-cooled engines have also definitely come of age from the standpoints of industrial recognition and acceptance.

It has taken the hard proof of service, under the most trying operating conditions, in many lines of industry and power applications . . . to convince designing engineers, equipment manufacturers, and tough-skinned users that AIR-COOLED ENGINES, properly designed and built, cause less trouble and provide higher productive capacity than any other type of internal combustion unit within 35 hp. limits.

More than 300 machine manufacturers use Wisconsin Heavy-Duty Air-Cooled Engines as standard power equipment . . . covering your field as well as many others.

MOST POWER PER POUND

WISCONSIN MOTOR Corporation
MILWAUKEE, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

If your shovels soon wear LIKE THIS demand RAZOR-BACK

the ONLY Shovel That's Forged 60% THICKER AT THE CUTTING EDGE and ALL THE WAY UP THE CENTER

HIGHWAY ENGINEER SAYS:

"After 2 months' use, shoveling coarse stone and spalls in a limestone quarry, the tips of the shovel blades show no appreciable wear. Quality is much better than several other makes purchased on the same State Highway specification."

Made by THE UNION FORK & HOE CO., COLUMBUS, OHIO
SEND FOR PRICES AND NAME OF NEAREST DISTRIBUTOR

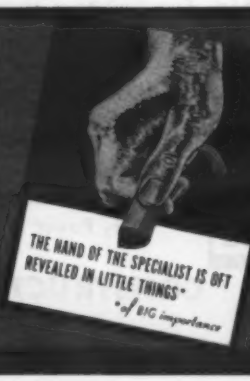
DEFENSE BULLETIN

DEFENSE CONSTRUCTION
Must Be Served

A highly important part of the work this plant is doing for National Defense is meeting the demand for all types of hose necessary for construction, repair, and maintenance on Government projects. Such work must go on and is receiving the necessary priority required on rubber and other critical material.

For years Continental hose has been held in high regard in construction fields. In filling such indirect but none the less vital defense orders, all of us at Continental must be constantly alert to give them the same wartime speed and precision which this plant is maintaining on direct orders for Army, Navy and Air Force requirements.

From Factory Bulletin Board of the
CONTINENTAL RUBBER WORKS
MAKERS OF THE VITALIC LINE SINCE 1901
ERIE, PA., U.S.A.



Constructing forms for a catch basin at a low point in the grade of the Oklahoma City Airport.

Equipment, Fueling On Airport Grading

(Continued from page 2)

amount of water hauling, which naturally increased the expense and might have slowed down operations if we had not planned and executed this part of the work very carefully. During most of this period, we kept three 1½-ton Ford sprinkler trucks busy hauling water from a creek about 1.5 miles from the airport and properly distributing it."

Excavation on the job ranged from 3 feet to 0.1 inch. The maximum fill was 5 feet, but most of the ground was comparatively level. The dirt was compacted in 6-inch layers, each layer receiving from four to eight passes by two 10-foot sheepsfoot rollers with a minimum pressure of 250 pounds per square inch.

The grading included moving 450,000 cubic yards of dirt at an average cost of 15 cents per yard. A total of 3,450 feet of ASTM-standard reinforced-concrete pipe was laid in the construction of the drainage system. This included 1,700 feet of 30-inch pipe, 550 feet of 36-inch and 1,200 feet of 48-inch pipe, and the construction of four intake basins. The average number of men employed in grading and drainage operations was 56.

Equipment on the Job

The major equipment used on the job, with the number of men on each machine, was as follows: one Caterpillar RD7 tractor with 10-foot sheepsfoot roller, and operator, for filling and compacting; one 22-foot x 48-inch Caterpillar elevating grader, with a capacity of 600 cubic yards an hour, powered by an Allis-Chalmers 80-hp gasoline tractor, operated by two men, for excavating and grading; one 16-yard Heil scraper with a Cletrac Model FD 108-hp tractor, with one operator, for grading, excavating and stripping; two 10-yard Continental scrapers operated with two Allis-Chalmers 80-hp butane-powered tractors, with two men each, for excavating, stripping and grading; one 11-yard butane-powered 50-hp Euclid and one gasoline-powered 50-hp Euclid, with one operator each, for hauling excavated material and for stripping and grading; one P&H gasoline-powered dragline with ¾-yard bucket and one Byers ¾-yard dragline for excavating, ditching, placing pipe and backfilling; two 9-yard gasoline-powered Koehring Dumptors, with one operator each, for hauling dirt; one International 72-hp TD-18 tractor with bulldozer and an 8-50 and bulldozer, operated with two 10-yard B-E scrapers, and two TD-18 International tractors on grading and backfilling; one Allis-Chalmers 80-hp tractor and bulldozer, with an operator, for grading and backfilling; one 65-hp Caterpillar diesel utility tractor, with an operator, for supplementary power for pushing or pulling equipment through mud or difficult soil conditions; one disk plow used only during very wet weather; two 2-inch centrifugal pumps, one gasoline and the other electrically powered, for pumping water for the sprinklers, and three 1½-ton Ford sprinkler trucks, two with 1,200-gallon water tanks and one with a 1,000-gallon tank, and their drivers.

Garage and Fueling

A field garage was maintained at the grading site and was manned night and day by skilled mechanics. The men kept the equipment in good working condition with a minimum loss of time for repairs. A 1½-ton Model A Ford grease truck, equipped with an air compressor and grease guns, kept all machinery properly lubricated, thus reducing maintenance and repair costs.

A record of fuel use and costs, including the cost of oil and grease, was kept in the engineer's office. This showed that the A-C gasoline tractors used 65 gallons of fuel in 8 hours, at a cost of $1.34 an hour; the A-C butane tractor consumed 65 gallons of fuel in 8 hours at a cost of 89 cents an hour; the Caterpillar diesel tractor used 15 gallons in 8 hours, costing 45 cents an hour; the elevating grader used 18 gallons of gasoline in 8 hours, at a cost of 50 cents an hour; the Euclid consumed 33 gallons of gasoline in 8 hours, costing 84 cents an hour; the butane-powered Euclid used 40 gallons of butane in 8 hours, at a cost of 67 cents an hour; the diesel motor patrol, 7 gallons in 8 hours, costing 37 cents an hour; the Model A Ford grease truck, 4 gallons of gasoline in 8 hours, costing 8 cents an hour; the Ford sprinkler trucks each used 8 gallons of gasoline in 8 hours, at 15 cents an hour; and the gasoline pump, 4 gallons in 8 hours, at 9 cents an hour.

Personnel

The CAA participated with Oklahoma City in financing the grading and drainage operations, and the WPA furnished some labor and supplementary funds in connection with the construction of runways. Lt.-Col. H. A. Montgomery, District Engineer, U. S. Engineer Office, Tulsa, Okla., drew the plans and specifications and furnished the engineering supervision with Fred R. Hemen, Resident Engineer at the site.

The organization for El Reno Construction Co., which held the contract for grading and drainage at this $1,600,000 airport, included F. Mervelt, President; Herman Mervelt, Secretary-Treasurer; R. K. Lawson, Superintendent of Construction; W. H. Green, Superintendent on this airport job; three foremen and 56 men.

Proper lubrication is no longer merely a matter of economy; it is now a patriotic duty to keep your equipment working at maximum efficiency.

Strip Coal for Sale

20 acres Pittsburgh seam coal, 1½ miles from R.R. Cover averages 15 feet. Very reasonable.

Address Box 233. Contractors and Engineers Monthly, 470 Fourth Avenue, New York.

PARSONS TRENCHERS

FOOTAGE COUNTS NOW!

Parsons Trenchers are operating night and day on cantonments, airports, and many other war production plants. Now, as in peace time, PARSONS TRENCHERS are digging ditches at high speed.

Many years of experience in design, construction, and thorough understanding of trench-digging problems are built into the modern PARSONS TRENCHERS. For fast, clean and deep digging, low maintenance cost, Parsons has long been accepted as the standard in the trenching machine field.

More ditch per minute is assured—Buy PARSONS.

THE PARSONS COMPANY
NEWTON, IOWA
We'll Move The Earth To Serve You

PACIFIC CRUSHERS

"Flood" Lubrication
EXTENDS LIFE OF BEARINGS

15"x28" 15"x38"
Equipped with "Flood" Lubrication and other time-tested features best suited for large tonnage primary crushing

Patent Pending

Write for BULLETINS

In this new lubrication system, originated by PACIFIC engineers, oil is picked up from lower reservoirs on collars firmly secured to shaft and distributed to all shaft bearing surfaces, prolonging their life and maintaining uninterrupted crusher service.

ALLOY STEEL & METALS CO.
1862 E. 55TH ST. LAfayette 0181 LOS ANGELES, CALIF.
Manufacturers of PACIFIC CRUSHING & SCREENING UNITS • PACIFIC SLUSHING SCRAPERS & SHEAVE BLOCKS • ALLOY-MANGANESE MILL LINERS & CRUSHER JAWS • PACIFIC ROCK BIT GRINDERS • HAND WINCHES • CRAWLER SHOES, TRACTOR RIMS and other Wearing Parts

For Trouble-Free..Low Cost..Primary Rock Crushing

Modern Developments In Diesel-Engine Oil

(Continued from page 19)

oils in industrial service began in 1926 when a specially compounded oil was developed to stop the "chattering" encountered in operating Model T Fords. Several years later, automotive engineers began intensive development work on a high-speed diesel engine satisfactory for use in farm equipment. Outside of the usual design and operating difficulties invariably encountered in such instances, it was soon found that piston rings were sticking so frequently that maintenance costs were making operators and manufacturers alike wonder if high-speed diesel engines were practical.

During this time the Standard Oil Co. of California had been working intensively on the development of a specially compounded oil which would be stable enough to resist the great oxidizing action of the high-speed diesel. After testing thousands of blends, announcement was made in 1936 of the first detergent compounded diesel-engine lubricating oil.

Due to the high power output of the high-speed diesel, some of the manufacturers of this equipment had gone to the use of special alloy bearings. While the new compounded diesel-engine oil had solved the problem of ring sticking, it unfortunately could be used only with engines having babbitt bearings, as it was corrosive to special alloys. Development work was therefore continued in an attempt to find a non-corrosive compounding and in March, 1939, after three years of additional intensive research, the Standard Oil Co. of California introduced the first compounded diesel-engine lubricating oil for use with any type of bearing.

The type of compounding generally used in industrial oils consists of animal or vegetable fats and acids or occasionally lead, sulphur and chlorine compounds. These are incorporated to increase such characteristics as oiliness, tenacity, film strength, etc., of oils used in steam cylinders, bearings, gears and similar services. These conventional compounding agents were not satisfactory under the high temperature and severe oxidizing conditions encountered in diesel-engine cylinders and bearings. This led to a new type of compounding utilizing metallic "soaps". It is not a single chemical compound but rather a complex mixture of several compounds, each of which was chosen for its effect on the whole.

Many compounds which are non-corrosive when used with one base oil may become quite corrosive if employed with some other oil. Furthermore, due to the different chemical nature of compoundings used by various manufacturers, mixing of different types of compounded oils should be avoided.

(Concluded on next page)

QUICKER & BETTER Floor Rodding and Finishing with Whiteman PRECISION PRODUCTS

Speed your concrete floor construction with:

1. ***The Whiteman Portable Rodding Machine***

This machine will not only rod your floors to a perfect level, but at the same time puddle and condense your concrete into a solid mass through the entire depth and over the whole area, bringing the moisture to the surface, preparatory to using—

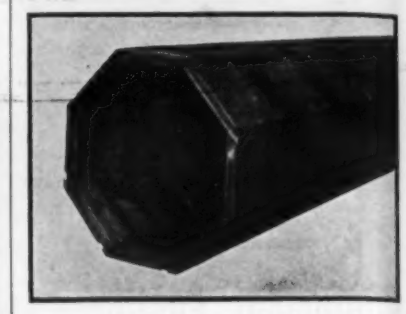
2. ***The Whiteman Precision Finishing Machine***

This portable power-operated machine will give you floors that last longer—level denser floors—perfectly finished floors —no humps—no depressions—no riffles—doing the job in less time, at materially reduced cost!

These two machines are making speed and cost records on large and small concrete floor jobs all over the country.

For the name of your nearest dealer—write WHITEMAN MANUFACTURING COMPANY Dept. C, 3249 Casitas Avenue LOS ANGELES, CALIFORNIA

NEW EMERGENCY PIPE



Solves War-Time Drainage Problems

Steel, a critical war material, must not be used in any drainage structure except where engineering integrity demands it. Yet here is a practical war-time substitute. It is the new ARMCO Emergency Pipe, designed by a drainage engineering organization with 38 years' experience.

This completely new design in wood drainage structures meets war-time emergency requirements. Steel bands, metal reinforcing or other critical materials are not required. The semi-flexible design provides ample strength to meet engineering standards. Yet this Emergency Pipe is light in weight for easy handling. Installation cost is low. There is no field assembly and skilled labor is not needed.

On the durability side ARMCO Emergency Pipe performs admirably as a war-time structure. It goes "all-out" in meeting the War Production Board's requirements for substituting non-critical materials wherever possible.

Use the ARMCO Emergency Pipe for essential culverts, storm sewers, underpasses or wherever else drainage structures are needed and vital materials must be conserved. Write for data. ARMCO DRAINAGE PRODUCTS ASSN., 445 Curtis St., Middletown, O.

ARMCO EMERGENCY PIPE

Cut MIXING Costs

Low cost production is important and essential to the successful contractor. H & B Bituminous Mixing Plants, both portable and stationary types, are designed with this problem foremost in mind. That the solution has been found is evidenced in the large proportion of Hetherington & Berner equipment to be found on the job today.

Your Inquiries Are Solicited

H&B Hetherington & Berner Inc. 701-745 KENTUCKY AVENUE INDIANAPOLIS, INDIANA ENGINEERS AND MANUFACTURERS

CONTRACTORS' EQUIPMENT

for sale or rent

1—Allis-Chalmers "K" Tractor with LaPlant-Choate Hydraulic Bulldozer

1—Allis-Chalmers "WK" Tractor with Gar Wood Hydraulic Bulldozer

1—Allis-Chalmers "WK" Tractor with Continental Hydraulic Bulldozer

1—International "T-20" Tractor with Gar Wood Hydraulic Bulldozer

1—Caterpillar "30" Tractor with LaPlant-Choate Hydraulic Bulldozer

1—Bay City ½-yd. Combination Shovel, Dragline and Clamshell complete with bucket

1—Novo 60-hp. Double Drum Dragline Hoist complete with ¾-yd. Bucket

1—McCormick-Deering Model "300" Power Unit complete with Pulley

1—9-ft. Pneumatic-tired Chip Spreader

1—Universal 8-16 Jaw Crusher on truck

3½-S and 7-S Concrete Mixers

Centrifugal, Single and Double Diaphragm Pumps

Address:

LAKESHORE MACHINERY & SUPPLY CO.

400 W. Laketon Ave., Muskegon, Mich.

Phone: 22-615

Proper Lubrication For Diesel Engines

(*Continued from preceding page*)

What Does Compounding Do?

This compounding material is, in the first place, an excellent anti-oxidant which means that it helps the lubricating oil base to resist deterioration from heat and oxygen, thereby minimizing the formation of deposits in the engine interior. Secondly, it increases the ability of the compounded oil to stay on very hot metal surfaces; and third, it has a detergent action which results in keeping the engine cleaner.

Another effect of using compounded oils is reduced wear, which results from the generally better lubrication due to the effects described above.

Compounded-Oil Characteristics

Due to the way in which the compounding operates, it is used up gradually. It is therefore necessary to maintain reasonable drain periods. In general, manufacturers' recommendations in this respect should be followed. At first glance, it might appear that this would increase costs, but actually the very great benefits accruing from reduced maintenance expense and longer periods between overhauls far outweigh any increase in oil expense.

Compounded oils all produce a more stable foam than that formed by straight mineral oils. They do not generate foam in any greater amount than uncompounded oils of the same viscosity, but the foam lasts longer and therefore it appears that compounded oils foam more.

One result of the detergent characteristics of compounded diesel oils is that the drainings always appear dark or black. This is normal and should be expected, as one essential purpose of the compounding agents is to keep the engine rather than the oil clean.

There is no simple method of laboratory analysis which will determine the value of compounding materials of the type described. Service tests and results are the only criterion that can be used. Therefore it is necessary for the operator to rely on the engine manufacturer and oil company for guidance in the selection and use of compounded diesel-engine lubricating oils. For example, both the Caterpillar Tractor Co. and the General Motors Corp. have standardized long-time engine tests at high loads as a criterion of the performance characteristics of compounded oils in their diesel engines.

There are, of course, many compounded lubricating oils on the market, and great care should be exercised in choosing among them. The service record and performance of such oils are of primary importance and should be reviewed carefully before any decision is made as to the use of any particular oil.

Ohio's Road Units Mobilized for War

Ohio has completed its mobilization of the Department of Highways' man power and motorized equipment for wartime emergency operation. The position occupied by the State Highway Department, as the largest motorized unit in the state government, has been emphasized by the fact that several civilian-defense organizations have asked the Department to remain intact as a unit in the face of a need for man power for various organized efforts.

The fundamental objective of the mobilization plan in Ohio is to aid counties and smaller municipalities which might not have sufficient personnel and equipment to handle emergencies. Regardless of their size, some of these governmental units may be located near defense plants, important railroad yards and junctions, power plants, vital bridges, dams, reservoirs and so on. Those counties which may not be in a combat zone or subject to bombing, under the State Highway Department's coordinating plan, could have their equipment and personnel shifted to a distressed area during the emergency.

The plan to be followed is to use the State Highway Patrol branch of the State Highway Department as the information gathering and disseminating group for reporting emergencies and for policing outside of municipalities. For such work as evacuating areas, demolishing and clearing, road and bridge repair, decontamination, removing rubble, blasting unsafe structures, handling traffic, and affording relief to industrial plants in the event of an emergency, the State Highway Department is intended to be used as the first line of defense. It will be prepared to offset sabotage damage, if any, and repair water reservoirs to keep industry going and protect public health, should such need arise.

The plan was drawn up by Director of Highways Hal G. Sours and his staff on instructions from Governor John W. Bricker.

New Light-Weight Grader

A light-weight grader built for year-round service, which weighs less than 3½ tons and will not bury itself in frost boils nor force the gravel down into the mud during the spring breakup, has been announced by Lull Mfg. Co., 3520 E. 43rd St., Minneapolis, Minn. The unit is designed especially for county and township work, for contractors in leveling oil-mix jobs, and for state highway departments for shoulder maintenance. It is built with heavy box-type construction and is powered with a Minneapolis-Moline tractor.

Complete information and pictures of the tractor at work are contained in a bulletin which may be secured direct from the manufacturer by mentioning this item.

Want information? Write the Editor.

Extra **power** for tandem rollers — with LE ROI Engines

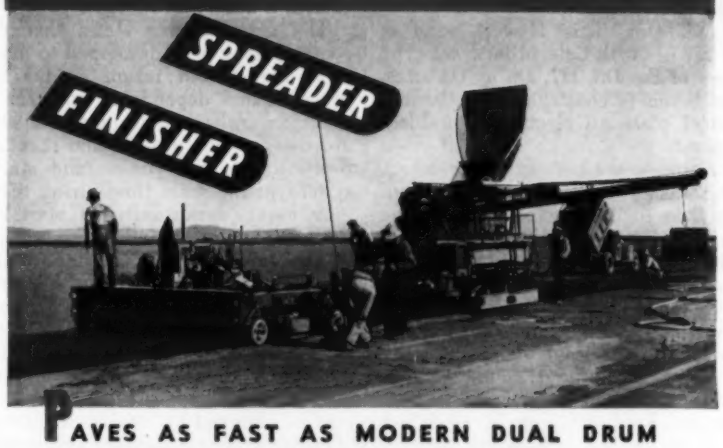
. . . typical of construction equipment Le Roi-equipped for dependable, trouble-free service

Big-machine power — compactly fitting into small-machine design. That's what C. H. & E. Mfg. Co., Milwaukee, Wis. needed for their tandem rollers. And that's what they found in Le Roi Engines. • They bought their first Le Roi in 1920 — and they're still buying them today, for a variety of CH&E equipment. Ample proof that CH&E users enjoy the power performance they expect. • Perhaps Le Roi Engines can add extra satisfaction as original equipment on *your* machines. Learn more about them. Look for them when you buy machinery . . . Write us about your requirements so that we can send you helpful information.

E-10

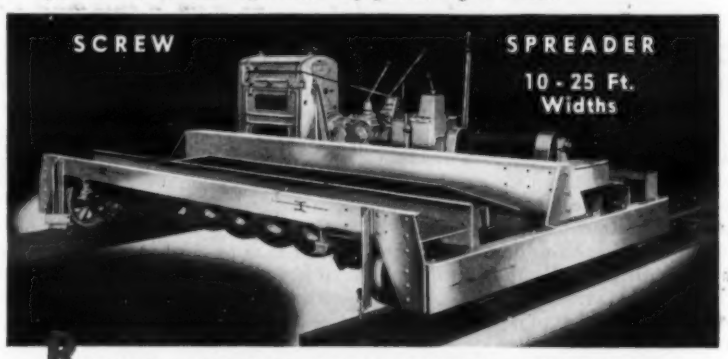
LE ROI COMPANY • MILWAUKEE, WISCONSIN

On Vital Roads and Airports, THIS JAEGER TEAM



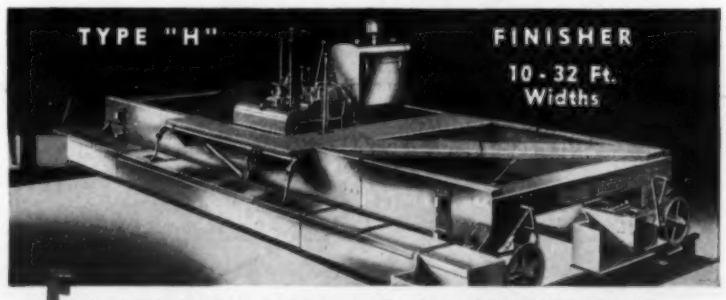
PAVES AS FAST AS MODERN DUAL DRUM OR TANDEM PAVERS CAN PRODUCE . . .

This "mechanized method," originated by Jaeger, has made it possible for contractors to spread and finish the harsh, dry mixes of today up to the full capacity of 34E dual drum or multiple pavers and in any standard width from 10 to 25 ft. A *necessity* with big pavers — an *advantage* with any paver, big or small.



REMIXES, SPREADS, ADDS DENSITY, STOPS SEGREGATION — VIBRATION IF DESIRED . . .

Easily spreads maximum paver production even in 10 ft. widths — strikes off base for steel, top for final finishing. Action of Jaeger Screw increases density and uniformity — the only method that guarantees against segregation. One operator replaces crew in pit.



FINISHES WITH SPEED AND SMOOTHNESS THAT CUT JOB COSTS TO THE MINIMUM . . .

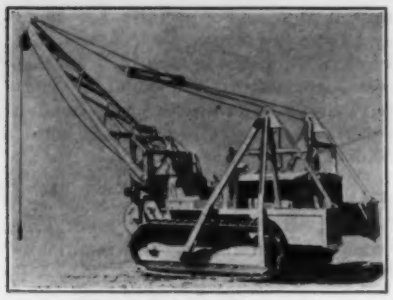
Unmatched for flexibility of speed and power, ease and completeness of control. Direct lever movement controls any function — 4 traction speeds — independent screed speeds, hydraulic screed lifts. "Velvet touch" smoothness saves on floating and hand work. Telescopic width changes up to 4 ft. Vibratory models give deep, internal vibration, the Jaeger method that insures maximum uniform density.

Send for Complete Catalog and Data

THE JAEGER MACHINE COMPANY

705 Dublin Ave., Columbus, Ohio

Concrete-Distributing Paving Equipment, Mixers, Pumps, Mixer-Trucks, Transit Mixers



The Hyster folding crane.

New Folding Crane Is Tractor-Mounted

A new folding crane with a 20-foot boom which can be quickly retracted, so that the tractor on which it is mounted may be moved from one place to another or used for other types of service, has been developed by the Willamette Hyster Co., 2908 N.E. Clackamas St., Portland, Ore. This Hyster crane is made for use with Caterpillar track-type tractors of the D8, D7, D6 or D4 sizes.

The boom is constructed of channel and steel plate all electrically welded, and pivots on a frame mounted on a Hyster tractor donkey or towing winch which transmits the hoisting and pulling power from the tractor motor. When the boom is to be retracted to the traveling position, the load hook is first attached to a loop near the base of the boom, then with the boom topping winch it is raised to a vertical position and from there it is lowered to the traveling position by the load line. Without counterweight, the lifting capacity of the crane is a maximum of 11,600 pounds, at 4 feet back of the winch with a D8 tractor, down to 2,300 pounds at 12 feet back of the winch with a D6 tractor.

Bulletin 606 describes and illustrates the new Hyster folding crane in detail. Copies may be secured by writing direct to the manufacturer and referring to this item.

Caterpillar Promotions

Following the recent death of Thomas John Connor, Vice President, the Caterpillar Tractor Co., Peoria, Ill., announced recently the promotion of Harmon S. Eberhard to a Vice Presidency of the company, the creation of a new Research Department headed by C. G. A. Rosen, the promotion of G. E. Burks to Chief Engineer, J. R. Munro to General Factory Manager, and Charles A. Woodley to Factory Manager of the Tractor Division.

Mr. Eberhard, who was named Chief Engineer in charge of all engineering activities of Caterpillar in 1933, now has administrative direction of research, engineering, manufacturing, industrial relations and training.

Automatic Engine Control

Synchro-Start Products, Inc., 221 East Cullerton St., Chicago, Ill., has available a series of bulletins illustrating and describing its most commonly used standard control units. These include overspeed governors to protect the engine against overspeed conditions; the Model SS Solenoid for use in operating throttles, fuel pump racks, chokes, etc.; Model 1436 Series control sets for full automatic start, stop, run and safety stop; automatic cranking controls; heavy-duty starting motor relays; time units and relays; and multiple engine control panels.

The manufacturer states that these controls have been developed to accomplish the desired results in the most practical and dependable manner. Its cranking cycles and protective methods are designed to provide the maximum protection to the engine and starting system, at the same time giving the engine every opportunity to start. The signal light system, indicating the cause of the engine failure, is important in directing the service man to the seat of the trouble, enabling quick adjustment.

Copies of this series of bulletins, showing standard controls and containing information on a combination to meet specific engineering requirements, may be obtained by writing direct to the manufacturer and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Woven Wire Screens Catalog

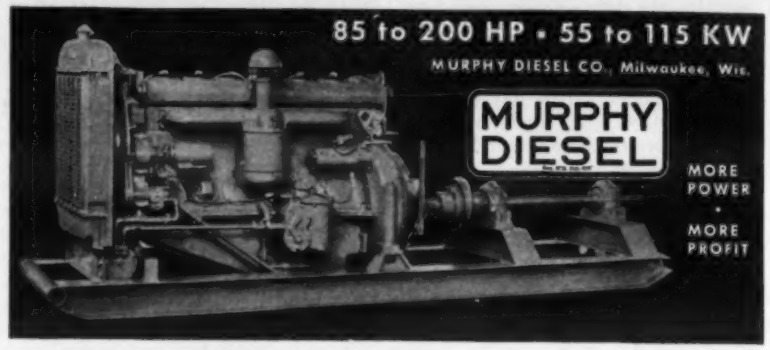
A very complete discussion of wire cloth, the warp and filling wires, mesh, space, wire size and metals available for heavy-duty screens will be found in the latest 43-page illustrated catalog of Wickwire Spencer Steel Co., 500 Fifth Avenue, New York City. A feature of the catalog is the actual wire-size illustrations with tables showing the wire gage and other data on each individual mesh of wire cloth.

Copies of this bulletin will be furnished free to readers of CONTRACTORS AND ENGINEERS MONTHLY on request by writing direct to the manufacturer on your business or official letterhead and mentioning this item.

Earth-Moving Equipment

A new complete equipment booklet describing the earth-moving, land-clearing and snow-removal equipment made by the LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, has recently been released.

Each model is described generally with information as to size and capacity. The fact that all equipment is built exclusively for use with Caterpillar tractors is emphasized, as is their world-wide sales and service organization. Sections are devoted to cable-operated scrapers, ranging in size from 12 to 33 cubic yards; to hydraulically-operated scrapers of 3.8 to 8.2 yards; and the new CW-10 Carrimor 10-cubic yard scraper. Trailbuilders, bulldozers, tampers, rippers and other tools are also included.



GOHI PIPE
CORRUGATED

Reclamation project

Stream diversion frequently requires a major operation, but in this installation GOHI Pipe solved the problem easily and permanently. The water is confined to its original course and a valuable building site preserved and safeguarded. Whatever your drainage problem, look to GOHI Pipe for the answer.

Consult the fabricator located nearest you, and ask for copy of 72-page book on modern drainage practice. It's FREE.

New England Bolt Co.	Everett, Mass.
Central Culvert Co.	Ottumwa, Iowa
Capital City Culvert Co.	Madison, Wisc.
Bancroft & Martin Rolling Mills Co.	S. Portland, Me.
Denver Steel & Iron Works Co.	Denver, Colo.
The Lane Pipe Corporation	Bath, N. Y.
Dixie Culvert Mfg. Co.	Little Rock, Ark.
St. Paul Corrugating Co.	St. Paul, Minn.
The Newport Culvert Co.	Newport, Ky.

GOHI Pipe meets Copper-Bearing Pure Iron requirements in all specifications published by nationally recognized specifying authorities.

GOHI CULVERT MANUFACTURERS, INC.,
NEWPORT, KY.

EXCLUSIVE ROAD ROLLER BUILDERS FOR 50 YEARS

THE BUFFALO-SPRINGFIELD ROLLER COMPANY
SPRINGFIELD, OHIO

RR Overhead Built To New Bomber Plant

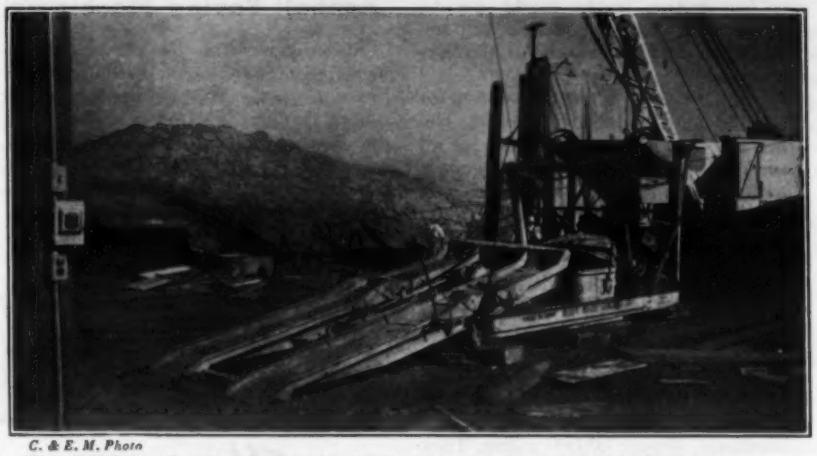
(*Continued from page 17*)

cause of the varying thickness. The end tie bars were welded to the long reinforcing bars to hold the end forms securely. The forms were shored with 4 x 6 braces, two on each side, with hand-operated mechanical lift jacks at the ground end for adjustment. Two cable tie-backs were used on the side away from the street leading to dead men in the fill.

Placing Ready-Mix Concrete

All of the concrete for the pours was furnished by the Red-D Mix Concrete Co. in 2-yard trucks, the concrete being mixed at the company's plant and hauled 8 miles to the job. The concrete was designed with a special aggregate to prevent segregation during the long haul and was given a 2-minute mix.

The pour for Pier 7 required 92 cubic yards, began at midnight, and was finished at 8:05 a.m. the following morning. The 2-yard dump trucks backed up a double steel ramp, end-dumped the 2 yards of concrete into a skip and then, after a lever at the side was thrown, putting a roller in front of the rear wheels of the truck and forcing them against a corrugated roller, the revolutions of the truck wheels in this tread mill drove an oil pump which provided the power for operating two hydraulic pistons which lifted the skip and dumped the concrete into a hopper at a higher elevation. From this hopper the concrete could be drawn off as desired into an Insley dump bucket which was handled by a Koehring 601 crane. The Insley bucket was equipped with special wings at the side to prevent spillage when being filled from the hopper.



C. & E. M. Photo

The steel ramp for dumping ready-mixed concrete and raising it to the hopper on an overpass for the railroad leading to a new bomber plant.

The concrete was vibrated constantly by two Mall mechanical vibrators during placing. The forms were stripped after 24 hours and the pier covered with burlap and kept wet continuously with a hose for 72 hours. A Novo double-plunger pump supplied the water under pressure from a stock tank which was refilled intermittently by a tank truck. The finishing of the piers was done with an Ingersoll-Rand pneumatic stone finisher and also a stone used with one of the Mall vibrator units.

Light during the night pours was furnished by two floodlights from an adjacent power line and an auxiliary LeRoi light plant with a 1,500-watt capacity generator supplying current to two other floodlights mounted on a tower on the same base as the generating unit.

Quantities

The major quantities involved in the construction of this railroad overpass were:

Excavation, structure	130 cubic yards
Treated bridge timber	34,736 MBM
Concrete	422 cubic yards
Reinforcing steel, piers	17,220 pounds
Treated timber piling	6,484 feet

This is exclusive of materials furnished and placed by the railroad.

Personnel

The substructure of this overpass, Project AI-FAGH 138A (4), was built by the Inland Construction Co. of Omaha, Nebraska, with R. C. Metivier as Superintendent. This company was awarded the contract on its bid of $27,049.90 by the Nebraska Department of Roads and Irrigation for which Lee Odman was Project Engineer.

Scruggs Elected Vice Pres.

W. S. Scruggs, who has been connected with the motor-truck and hoist industries for 25 years, and who is General Manager of the St.Paul Hydraulic Hoist Co., Minneapolis, Minn., has recently been elected a Vice President of that company.

★ No-Drip *"Turn-Up"* Spray Bar
★ Long-Lasting Sheet Steel Jacket
★ Compact, Insulated Pump Housing
★ *"Vacu-Flo"* Cleaning System
★ Compact, Simple, Circulating System
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★ BOOST PRODUCTION ★
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PAGE *Automatic* DRAGLINE BUCKETS

Address this Coupon to: Dept. D-3, Page Engineering Company, c/o Clearing Post Office, Chicago, Ill.
Without obligating me in any way, mail a copy of your new descriptive bulletin titled "Your Dragline CAN Move Dirt Faster."

*Name*_____ *City*_____

*Street*_____ *State*_____

Civil Routes Marked In Metropolitan Area

(*Continued from page 10*)

and congested sharp-angle intersections on the secondary highways are a serious menace to an orderly traffic movement under emergency conditions.

As part of the subcommittee work, the three state highway departments are currently engaged in listing all such potential bottlenecks on the secondary highway system, together with all points at which the secondary system crosses main highways at grades. These data will be forwarded to the State Defense Councils and their aid enlisted in correcting these conditions as defense highway funds can be made available for the purpose.

In the meanwhile, some thought is being given to the possibility of using portable or temporary overpasses in emergencies, particularly at points where the secondary network crosses the primary at grade. One such overpass unit is now available commercially.

Preparation of Map

This secondary highway network information is to be incorporated on a special base map of the region now being prepared. The map will be an invaluable aid in the overall task of handling emergency transport problems in the Metropolitan Area. It is being drafted in atlas form on a scale of approximately 2 inches to the mile for the entire region. In addition to basic highway data, the location of all food terminals and proposed traffic control or regulating stations in the area will be included. It will indicate potential bottleneck points, especially those points at which special police control will be necessary in the event that heavy traffic is diverted from the main routes to the secondary system.

Effect of Bombing

One contingency which coastal cities must consider is the possible bombing of an important group of piers or terminals. Much of the New York waterfront, for example, is on wooden structures. All waterfront fires are potentially serious. One hostile plane can carry 2,000 incendiary bombs and be reasonably certain of 15 per cent hits over a 6-mile path in two minutes and might start 300 simultaneous waterfront fires. Under such conditions, trucks might not be able to reach their destination and unload for a matter of hours or perhaps even days.

One of the most important phases of this problem is food transportation. The principal terminals for the receipt of fresh fruits and vegetables in the New York area are the piers of the Erie Railroad, the Baltimore & Ohio and the Pennsylvania. This is the primary food distribution center for virtually the whole Metropolitan District, which includes New York City, four other New York counties, nine New Jersey counties and part of Fairfield County, Connecticut. The resident population is 11,974,093 and the out-of-district transient population (not intra-region commuters) is over 60,000 a day. They consume 27,000 tons of food a day. Over 50 per cent of the milk, live poultry, fish, fresh fruits and vegetables come by truck. It is not difficult to conceive of a waterfront fire which could make the entire food terminal area in lower Manhattan unusuable. In the event of such a catastrophe, it would be imperative to shift all rail and truck traffic in a few hours to some other area. A special subcommittee is developing a program to provide for the necessary coordination between the transportation services and the trade. Alternate delivery points are being designated for every primary food-receiving terminal in the area.

Conclusion

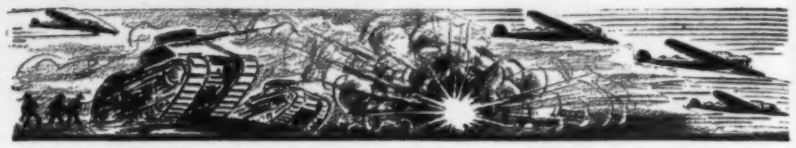
The New York Metropolitan Defense Transport Committee has no executive powers. It can not order anyone to do anything and is not seeking any such powers. It is a regional agency of public officials for emergency defense planning in the field of transportation. When agreement is reached on any emergency plans the membership of the Committee individually is the assurance of the effectuation of the plans. No one knows when or where the bombs will fall first in this country but we do know that highways and highway traffic are going to bear the brunt of emergency transport in any bombed area. There are 12,000,000 people in the New York Metropolitan Area and more motor vehicles than in all England. The Metropolitan Defense Transport Committee is trying to pave the way for the future safety of these millions.

From a paper presented at the 18th Annual Convention, Association of State Highway Officials of the North Atlantic States, Philadelphia, Pa.

Asphalt Paving Machinery

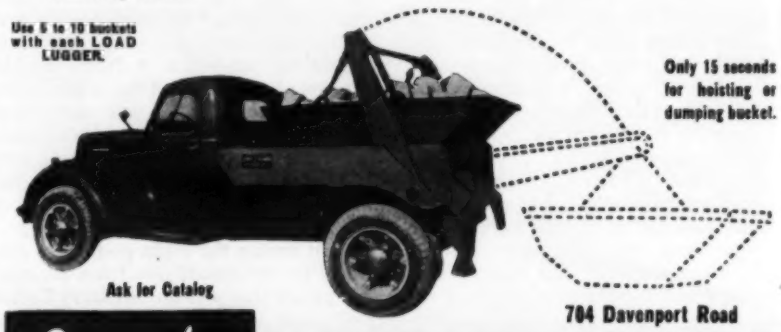
Bulletins covering the complete Cummer line of equipment, including combination hot and cold-mix asphalt plants, 4,000 and 5,000-pound mixers, the new Cummer internal-fire driers, two-fire combination drier-coolers, steam-jacketed asphalt buckets, an improved adjustable mixer tooth, mechanical feeders, and portable hot-mix asphalt plants, have been issued by the F. D. Cummer & Son Co., Cleveland, Ohio. Each particular piece of equipment is clearly illustrated and described at length, and testimonials from Cummer users are included.

Copies of the bulletin covering the specific equipment in which you are interested may be obtained direct from the manufacturer by mentioning this item.



There is no time to lose!

Doubling production on the "home front" demands new and faster methods. You can speed up the handling of materials and supplies with the Brooks LOAD LUGGER System. With a LOAD LUGGER mounted on a truck chassis, you can move as much yardage as a fleet of trucks. Hauling is continuous . . . no need for idle equipment, waiting to be loaded. You can save time and cut costs on contract jobs for material handling wherever loading is done by hand.


Use 5 to 10 buckets with each LOAD LUGGER.
Only 15 seconds for hoisting or dumping bucket.
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Brooks EQUIPMENT AND MFG. CO.
Distributors in all Principal Cities
KNOXVILLE · TENNESSEE

Galion No. 101 motor grader on a road widening job. This big grader has full revolving circle to permit any blade adjustment—diesel or gasoline engine—all-gear driven double drive—centralized finger-tip controls and other important features.

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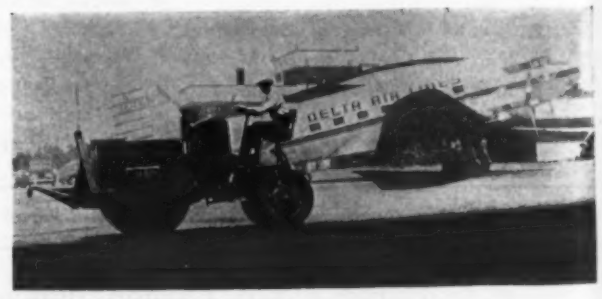
Galion everywhere . . . working on access roads to airports, camps, navy yards and other Victory construction projects. People as well as machines must give everything possible—we have a war to win—let's go and go faster.



Galion portable roller (right) compacting black-top on runways in Airport construction. Weight variable from 7800 to 10,000 lbs.—easily portable by attaching to truck. 4-cylinder gasoline engine.

GALION ROAD MACHINERY
THE GALION IRON WORKS & MFG. CO.
GALION, OHIO

WE'RE IN IT
LET'S WIN IT

Process Soil Cement—Faster, Better!!

WITH *Heavy-Duty*

KILLEFER MATERIAL MIXERS

"It takes record-breaking equipment to break a record," says one contractor after processing 18,585 yards of soil cement in a single day, using Killefer Material Mixers and Disk Harrows.

There is a reason why Killefer Material Mixers are "champion" performers. Their big capacity and rugged construction match the speed and power of the largest tractor.

Killefer Heavy-Duty Disk Harrows are also "star" performers. The wide-angled gangs of oversize disk blades do a real job of pulverizing and disking. Completely tractor-controlled, they speed up processing soil cement.

SOLD BY CATERPILLAR DEALERS EVERYWHERE

A new heavy-duty jack.

A New 15-Ton Jack Handles Anything

An improved heavy-duty automatic-lowering ratchet-type jack has recently been placed on the market by the Buda Co., Harvey, Ill. This Model 2215-S jack has a capacity of 15 tons with a 13¼-inch rise and a height, closed, of 22½ inches. It is designed especially for heavy-duty and outside work such as is found on construction jobs.

The jack has a hinged base which permits it to be tilted for various kinds of work, such as pole pulling, lifting vehicles out of the mud, and lifting or moving machinery and heavy equipment. It is furnished as standard with a double-lever-socket chain-type cap and with a 5-foot chain, with one lift and one grab hook.

Complete information on the features of this jack may be secured direct from the manufacturer by mentioning this item.

Promotions at Cummins

The Cummins Engine Co., Columbus, Ind., announced recently the appointment of D. J. Buttles as Western Manager, with offices in the newly-established factory branch at Salt Lake City. Under Mr. Buttles' management are three sales regions, with R. H. Wills in charge of the Northwest Region; Tom Collins, the Southwest Region; and a new man will soon be selected to cover the third region with offices either at the branch in Salt Lake City or the sub-branch in Denver.

Harry K. Smyth has been named Eastern Regional Manager, following his appointment last August as Cummins Export Manager. As Export-Eastern Regional Manager, he will supervise all Cummins sales activities in these two territories, with offices in the Chrysler Building, New York City.

With the Cummins factory now on a 24-hour, 7-day a week schedule, engine production has been stepped up nearly three times. This entire engine volume, it is reported, is going directly to prime defense uses.

Catalog on Caisson Pumps

Practical information concerning pump adaptation for a wide range of duties under varying conditions is the theme of a new catalog recently published by Pomona Pump Co., 206 E. Commercial Street, Pomona, Calif. Pomona pumps for such operations as sump and caisson dewatering, and dredge transfer are characterized, it is stated, by their simplicity of construction, compactness, ease of installation, elimination of priming, low starting torque, variable capacity adjustability and reduced maintenance cost. A single pump may be used for both suction purposes and external high heads, while additional stages may be added or subtracted to provide for higher or lower pressures as conditions may require.

Copies of this catalog, which also contains illustrated case histories of varied applications, may be obtained by writing direct to the manufacturer.

Large-Capacity Driers

Stationary and portable driers in 14 sizes from 36 inches diameter and 8 feet long to 72 inches diameter and 30 feet long are made for high-capacity production by Standard Steel Corp., 5001 Boyle Ave., Los Angeles, Calif.

Bulletins 512 and 613 describe and illustrate these driers with their standard heavy refractory-lined fireboxes, solid and pneumatic-tire mounting, and precision construction. By mentioning this item when writing direct to the manufacturer, you will secure these bulletins promptly.

WELDED
ROLLED STEEL CONSTRUCTION

FOR GREATER STRENGTH AND SPEED

An operator really makes time with a Williams Bucket on the end of his boom. A few grabs and another full loaded truck is on its way. Williams Buckets have tremendous closing power—they dig deep—bite clean and come up with heaping loads. Williams Buckets are "built to last and move dirt fast." And that's exactly what a contractor wants—long service at little maintenance cost, and fast, dependable action when moving yardage spells profits.

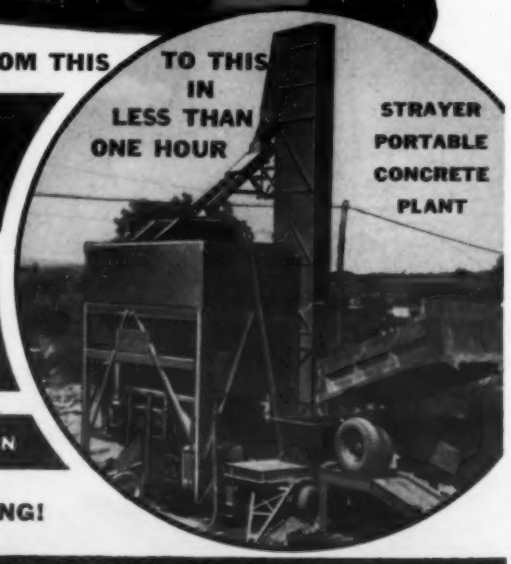
If you want the full engineering story on each type and capacity of Williams Buckets, send for individual descriptive folder. You'll find ample reasons why your next bucket should be a Williams.

THE WELLMAN ENGINEERING CO.
7012 Central Ave. • Cleveland, Ohio
Distributors in all parts of the country

WILLIAMS *Buckets*
built by WELLMAN

MOBILE *Concrete* BATTERY
ROLLS INTO ACTION
for UNCLE SAM

FROM THIS TO THIS IN LESS THAN ONE HOUR



SAVE TIRES AND GAS
REPLACES SEVERAL TRUCK MIXERS

MAKES UP TO 40 YARDS OF SPECIFICATION CONCRETE/HR.

ONE MAN OPERATION

STRAYER PORTABLE CONCRETE PLANT

LET'S GET GOING!

PORTABLE AND STATIONARY CONCRETE PLANTS
ERIE STEEL CONSTRUCTION CO.
642 GEIST ROAD • ERIE, PENNSYLVANIA
BINS • DIGGING AND REHANDLING BUCKETS • ELECTRIC BUCKETS

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Contractors and Engineers Monthly

Steps in maintenance patching on Minnesota Highway 95, near Princeton. At left, hand-cleaning depressions between the edge of the pavement and the shoulder, prior to patching. Right, sprinkling tar in the holes to be patched in order to secure a good bond. Below, unloading and raking the pre-mixed patching material preparatory to rolling. See page 14.

C. & E. M. Photos

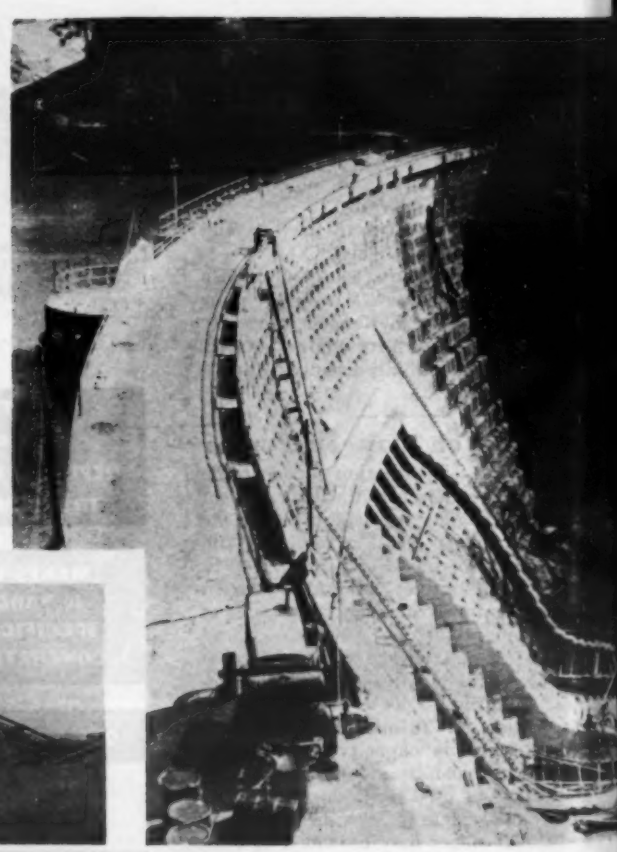
Left, at a hydrant connection on the edge of Madison, Nebr., a tank truck takes on water for the soil-stabilized base on Lee & Johnson's strategic-network contract on U. S. 81.

Right, the Barber-Greene traveling mixer, with its trailer tank and two tank trucks delivering water to the mixer, on the Lee & Johnson job south of Madison, Nebraska. See page 1.

C. & E. M. Photos

On the Oklahoma Contracting Co.'s section of the recently completed 1,261-mile gasoline pipe line from Baton Rouge, La., to Greensboro, N. C., this tractor with side boom was used to lower the 12¾-inch pipe into the trench. The pipe, in 40 to 45-foot lengths, was welded after it was in place. See page 1.

The Pioneer crushing and screening plant used by Dunn County, Wis., to produce aggregate for its county oil-aggregate program, for state work, and, in winter, to crush about 10,000 tons of agricultural limestone for sale to farmers. See page 2.



Alpine Dam, near Fairfax, California, has been raise 31 feet and reinforced in order to increase the wat supply for the Marin Municipal Water District. Th work, which was done by Engineers, Ltd., just abo doubles the reservoir capacity. See page 20.